

299-W15-46 (C3426) Log Data Report

Borehole Information:

| | | | | | |
|-------------------------------------|---------------|------------------------------------|----------------------------------|-------------------------|-------------|
| Borehole: 299-W15-46 (C3426) | | Site: 216-Z-9 Crib | | | |
| Coordinates (WA State Plane) | | GWL (ft)¹: 222.6 | GWL Date: 01/26/05 | | |
| North | East | Drill Date | TOC² Elevation | Total Depth (ft) | Type |
| Not Available | Not Available | 01//05 | N/A ³ | 525 | Cable |

Casing Information:

| Casing Type | Stickup (ft) | Outer Diameter (in.) | Inside Diameter (in.) | Thickness (in.) | Top (ft) | Bottom (ft) |
|--------------------|---------------------|-----------------------------|------------------------------|------------------------|-----------------|--------------------|
| Threaded steel | N/A | 13 1/2 | 12 3/8 | 9/16 | 0 | 123.8 |
| Threaded steel | N/A | 11 3/4 | 10 3/4 | 1/2 | 0 | 200.8 |
| Threaded steel | N/A | 9 5/8 | 8 1/2 | 9/16 | 0 | 420 |
| Threaded steel | N/A | 7 | 5 7/8 | 9/16 | 0 | 498 |

Borehole Notes:

The logging engineer used a caliper to determine the outside casing diameters for the casings. The caliper and inside casing diameters were measured using a steel tape. All measurements were rounded to the nearest 1/16 in. The drilling supervisor reported the casing depths and groundwater level. All logging measurements are referenced to ground surface.

When the borehole was logged on April 26-27, 2004, the total depth was 119.5 ft, and the bottom of the 13.5-in. outer diameter (OD) casing was at 116 ft; the maximum log depth was 117 ft. On August 4, 2004, total depth was 128 ft and the 13.5-in. OD casing extended to 123.8 ft; maximum log depth was 123.5 ft. An 11.75-in. OD casing was used to complete the borehole to a depth of 201 ft and was logged August 31 and September 1, 2004. Additional reductions in casing size occurred at 420 and 498 ft. Each borehole logging event occurred in a single casing string. Four different spectral gamma logging systems (SGLSs) were used in this borehole between April 2004 and January 2005.

Logging Equipment Information:

| | |
|----------------------------------|--|
| Logging System: Gamma 1G | Type: SGLS (35%) 34TP10967A |
| Calibration Date: 01/2004 | Calibration Reference: GJO-2004-597-TAC |
| | Logging Procedure: MAC-HGLP 1.6.5, Rev. 0 |

| | |
|----------------------------------|--|
| Logging System: Gamma 2A | Type: SGLS (35%) 34TP20893A |
| Calibration Date: 03/2004 | Calibration Reference: DOE-EM/GJ642-2004 |
| | Logging Procedure: MAC-HGLP 1.6.5, Rev. 0 |

| | | | |
|--------------------------|--|-------------------------------|-----------------------|
| Logging System: | Gamma 4E | Type: | SGLS (70%) 34TP40587A |
| Calibration Date: | 07/2004 | Calibration Reference: | DOE-EM/GJ692-2004 |
| | Logging Procedure: MAC-HGLP 1.6.5, Rev. 0 | | |

| | | | |
|--------------------------|--|-------------------------------|-----------------------|
| Logging System: | Gamma 1E | Type: | SGLS (70%) 34TP40587A |
| Calibration Date: | 10/2004 | Calibration Reference: | DOE-EM/GJ770-2004 |
| | Logging Procedure: MAC-HGLP 1.6.5, Rev. 0 | | |

| | | | |
|--------------------------|--|-------------------------------|-----------------------|
| Logging System: | Gamma 2L | Type: | Passive Neutron U1754 |
| Calibration Date: | None | Calibration Reference: | None |
| | Logging Procedure: MAC-HGLP 1.6.5, Rev. 0 | | |

Spectral Gamma Logging System (SGLS) Log Run Information:

| Log Run | 1 | 2 – Repeat | 3 | 7- Repeat | 8-Repeat |
|--------------------------|--|---|--------------------------|--------------------------|--------------------------|
| Date | 04/26/04 | 04/27/04 | 04/27/04 | 08/04/04 | 08/04/04 |
| Logging Engineer | Spatz | Spatz | Spatz | Spatz | Spatz |
| Start Depth (ft) | 0.0 | 44.0 | 91.0 | 47.0 | 63.0 |
| Finish Depth (ft) | 92.0 | 58.0 | 117.0 | 52.0 | 67.0 |
| Count Time (sec) | 200 | 400 | 200 | 200 | 200 |
| Live/Real | R | R | R | R | R |
| Shield (Y/N) | N | N | N | N | N |
| MSA Interval (ft) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| ft/min | N/A | N/A | N/A | N/A | N/A |
| Pre-Verification | AG074CAB | AG075CAB | AG075CAB | BA375CAB | BA375CAB |
| Start File | AG074000 | AG075000 | AG075015 | BA375000 | BA375006 |
| Finish File | AG074092 | AG075014 | AG075041 | BA375005 | BA375010 |
| Post-Verification | AG074CAA | AG075CAA | AG075CAA | BA375CAA | BA375CAA |
| Depth Return Error (in.) | -1 | N/A | -1 | N/A | N/A |
| Comments | Fine-gain adjustment made after files -066 and -086. | No fine-gain adjustment. Count time changed to 400 sec. | No fine-gain adjustment. | No fine-gain adjustment. | No fine-gain adjustment. |

| Log Run | 9 | 10-Repeat | 11 | 12 - Repeat | 15 |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Date | 08/04/04 | 08/04/04 | 08/31/04 | 08/31/04 | 12/01/04 |
| Logging Engineer | Spatz | Spatz | Pearson | Pearson | Spatz |
| Start Depth (ft) | 109.0 | 116.0 | 197.0 | 120.0 | 415.0 |
| Finish Depth (ft) | 123.5 | 116.0 | 110.0 | 110.0 | 264.0 |
| Count Time (sec) | 200 | 1000 | 100 | 100 | 100 |
| Live/Real | R | R | R | R | R |
| Shield (Y/N) | N | N | N | N | N |
| MSA Interval (ft) | 0.5 | N/A | 1.0 | 1.0 | 1.0 |
| ft/min | N/A | N/A | N/A | N/A | N/A |
| Pre-Verification | BA375CAB | BA375CAB | DE311CAB | DE311CAB | AE031CAB |
| Start File | BA375011 | BA375041 | DE311000 | DE311088 | AE031000 |
| Finish File | BA375040 | BA375041 | DE311087 | DE311098 | AE031152 |
| Post-Verification | BA375CAA | BA375CAA | DE311CAA | DE311CAA | AE031CAA |
| Depth Return Error (in.) | N/A | +1 | N/A | - 1 | - 1.5 |
| Comments | No fine-gain adjustment. | No fine-gain adjustment. | No fine-gain adjustment. | No fine-gain adjustment. | No fine-gain adjustment. |

| Log Run | 16 - Repeat | 17 | 18 | 19 - Repeat | |
|--------------------------|--------------------------|--------------------------|---|--------------------------|--|
| Date | 12/02/04 | 12/02/04 | 01/27/05 | 01/27/05 | |
| Logging Engineer | Spatz | Spatz | Spatz | Spatz | |
| Start Depth (ft) | 286.0 | 263.0 | 503.0 | 428.0 | |
| Finish Depth (ft) | 264.0 | 197.0 | 414.0 | 418.0 | |
| Count Time (sec) | 100 | 100 | 100 | 100 | |
| Live/Real | R | R | R | R | |
| Shield (Y/N) | N | N | N | N | |
| MSA Interval (ft) | 1.0 | 1.0 | 1.0 | 1.0 | |
| ft/min | N/A | N/A | N/A | N/A | |
| Pre-Verification | AE032CAB | AE032CAB | DE601CAB | DE601CAB | |
| Start File | AE032000 | AE032023 | DE601000 | DE601090 | |
| Finish File | AE032022 | AE032089 | DE601089 | DE601100 | |
| Post-Verification | AE032CAA | AE032CAA | DE601CAA | DE601CAA | |
| Depth Return Error (in.) | N/A | - 2 | N/A | - 3 | |
| Comments | No fine-gain adjustment. | No fine-gain adjustment. | At bottom of hole a radical fine-gain adjustment was made before logging. | No fine-gain adjustment. | |

Passive Neutron (PN) Log Run Information:

| Log Run | 4 | 5 | 6 - Repeat | 13 | 14 - Repeat |
|--------------------------|----------|----------|------------|----------|-------------|
| Date | 08/03/04 | 08/03/04 | 08/03/04 | 09/01/04 | 09/01/04 |
| Logging Engineer | Spatz | Spatz | Spatz | Pearson | Pearson |
| Start Depth (ft) | 0.0 | 100.0 | 45.0 | 110.0 | 110.0 |
| Finish Depth (ft) | 101.0 | 123.0 | 55.0 | 197.25 | 120.0 |
| Count Time (sec) | N/A | N/A | N/A | N/A | N/A |
| Live/Real | R | R | R | R | R |
| Shield (Y/N) | N | N | N | N | N |
| MSA Interval (ft) | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| ft/min | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Pre-Verification | BL000CAB | BL000CAB | BL000CAB | DL062CAB | DL062CAB |
| Start File | BL000000 | BL000405 | BL000498 | DL062000 | DL062350 |
| Finish File | BL000404 | BL000497 | BL000538 | DL062349 | DL062390 |
| Post-Verification | BL000CAA | BL000CAA | BL000CAA | DL062CAA | DL062CAA |
| Depth Return Error (in.) | N/A | N/A | 0 | N/A | - 1 |
| Comments | None | None | None | | None |

Logging Operation Notes:

Logging was conducted April 26-27, 2004, using SGLS logging system Gamma 1G. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K , ^{238}U , and ^{232}Th) verifier with serial number 118. A region of interest between 44 and 58 ft was re-logged (log run 2) at enhanced counting time (400 sec.) to further investigate energy peaks observed in the original log run (log run 1).

The borehole was deepened from 119.5 ft to approximately 128 ft and additional logging was conducted August 4, 2004, with SGLS logging system Gamma 2A to a depth of 123.5 ft. The KUT verifier with serial number 082 was used for verification measurements. Sections were re-logged between 47 and 52 ft and 63 and 67 ft. These depth intervals straddled the highest ^{239}Pu concentrations detected during the logging in April. It was believed that this log data might help establish if some of the observed contamination was inside the casing. The interval from 109 ft to total depth was logged at 0.5-ft intervals

to obtain additional detail through the caliche zone. A 1,000-sec. counting time was used at 116 ft, which is at the approximate top of the caliche.

The borehole was again deepened to approximately 201 ft and was logged to a depth of 197 ft with logging system Gamma 4E on August 31. The KUT verifier with serial number 082 was used for verification measurements.

On December 1 and 2, 2004, the borehole was logged from 197 to 415 ft using Gamma 1E. The KUT verifier with serial number 118 was used for verification measurements.

The final log data were acquired January 27, 2005, from 414 ft to total logging depth of 503 ft. Logging was terminated in the open borehole 5 ft below the casing depth of 498 ft.

Passive neutron logging was also performed in the borehole to detect neutrons that may be generated by interactions of alpha particles in the soil, or, to a lesser extent, from spontaneous fission. Logging using this sonde was discontinued after a depth of 197 ft because no evidence of contamination had been detected with the SGLSs below this depth.

Analysis Notes:

| | | | | | |
|-----------------|---------|--------------|----------|-------------------|------------------------|
| Analyst: | Henwood | Date: | 02/18/05 | Reference: | GJO-HGLP 1.6.3, Rev. 0 |
|-----------------|---------|--------------|----------|-------------------|------------------------|

SGLS pre-run and post-run verification spectra were collected at the beginning and end of each day of logging. All of the verification spectra were within the acceptance criteria. Examinations of spectra indicate that the detector functioned normally during each logging run and the spectra are accepted.

Verification spectra using an AmBe neutron source were acquired for the passive neutron logging system. Currently there are no verification criteria established for this system. The counts obtained from the pre- and post-verifications were within 1 percent.

Log spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source files: G1GJan04.xls, G2AMar04.xls, G1EJan04.xls, and G4Ejul04.xls, for the respective logging systems). The casing configuration was assumed as one string of 13-in. casing with a thickness of 9/16 in. for log runs 1-10, 11-in. casing with a thickness of 0.5-in. for log runs 11-14, 9-in. casing with a thickness of 9/16-in. for log runs 15-17, and 7-in. casing with a thickness of 9/16-in. for log runs 18-19. No dead time corrections were applied to the data. Water corrections were applied to the data below 222 ft in depth.

Log Plot Notes:

Separate log plots are provided for gross gamma and passive neutron, naturally occurring radionuclides (^{40}K , ^{238}U , and ^{232}Th), and man-made radionuclides. Man-made plots are included for ^{241}Am and ^{239}Pu that compare assays using different gamma energy peaks. Plots of the repeat logs versus the original logs are included. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. The ^{214}Bi peak at 1764 keV was used to determine the naturally occurring ^{238}U concentrations on the combination plot rather than the ^{214}Bi peak at 609 keV because it exhibited slightly higher net counts per second.

Results and Interpretations:

^{233}Pa , ^{241}Am , and ^{239}Pu were the man-made radionuclides detected in this borehole. ^{233}Pa , a decay product of ^{237}Np , which is determined from an energy peak at 312 keV, was detected between 47 and 120 ft with a maximum concentration of approximately 100 pCi/g at 118 ft.

^{241}Am (662.4 keV) was detected from 46 to 61 ft at concentrations ranging from 56,000 to 145,000 pCi/g. It was also detected almost continuously from 63 to 118 ft at concentrations ranging from just above the MDL of approximately 20,000 to 400,000 pCi/g; the maximum concentration is measured at 116 ft. Energy peaks attributed to ^{241}Am were detected at approximately 59.54, 208.01, 662.40, and 722.01 keV (see ^{241}Am Plot). The percent yields are $35.9 \text{ E-}02$, $7.91 \text{ E-}06$, $3.64 \text{ E-}06$, and $1.96 \text{ E-}06$, respectively. Although the 59.54-keV gamma ray exhibits the highest yield, the low-energy gamma ray is severely attenuated by the 9/16-in.-thick casing and the tool housing itself. Therefore, the 59.54-keV energy peak is not expected to be detected throughout the casing and, if it were, an appropriate calibration is not available (the SGLS calibration range is 186 to 2615 keV).

The assays of the ^{241}Am based on gamma rays at 662.4 and 722.01 keV roughly coincide, suggesting the calibration at this energy range is appropriate and the relatively high-energy gamma rays are penetrating the casing. Because the gamma rays from the 662.40-keV energy peak have a slightly higher yield than the 722.01-keV energy peak, the former is used to provide the assay for ^{241}Am . In addition, the 722.01-keV energy peak is subject to minor interference from gamma rays from ^{208}Tl at 722.04 keV that may cause a slight over estimation of concentrations.

The ^{241}Am concentrations derived from the 208.01-keV gamma line also appear to be slightly overestimated. A 208.00-keV gamma line that results from the decay of ^{237}U may interfere with the 208.01-keV gamma line from ^{241}Am . These nearly coincident peak energies cannot be resolved with the SGLS. ^{237}U (6.75 day half life) is formed by alpha decay of ^{241}Pu (half life of 14.35 years) with a branching ratio of 0.002457 percent. Hence, the presence of ^{237}U indicates that ^{241}Pu is also present.

Interference to the 662.40-keV energy peak can be caused by the ^{137}Cs gamma ray at 661.62 keV. However, because the assays for ^{241}Am originating from the 722.01 and 662.40-keV energy peaks coincide, it is likely that gamma rays at this energy can be attributed to ^{241}Am . Possible exceptions are the peaks at approximately 662 keV detected near the ground surface, at 8 and 17 ft, and at 151 ft that may represent ^{137}Cs . The 722.01-keV energy peak was not observed at these depths. If these detections were attributed to ^{137}Cs , the concentrations would be less than 0.3 pCi/g.

The plot (Am-241 Energy Peak Comparison) of ^{241}Am (59.54 keV) suggests that at least some ^{241}Am may reside, in part, on the inside of the casing. The 60-keV peaks observed at 106 and 113 ft in the April logs appear to have been displaced downward to 113 and 120 ft in the August data. This displacement is consistent with casing contamination, because the 13.5-in. casing was driven from 116 to 123.8 ft between the two log events. However the 662.4 and 722.01-keV peaks at 110 and 116 ft are not displaced, indicating that the bulk of contamination resides in the formation at 110 and 116 ft.

^{239}Pu was detected between 47 and 51 ft with a maximum concentration of approximately 284,000 pCi/g at 48 ft. It was also detected almost continuously between 55 and 86 ft at concentrations ranging from approximately 27,000 to 221,000 pCi/g; the maximum concentration is measured at 65 ft. ^{239}Pu was also detected at 110 and 116 ft at concentrations of 41,000 and 58,000 pCi/g, respectively. Energy peaks associated with ^{239}Pu were detected at approximately 129, 345, 375, and 414 keV (see ^{239}Pu plot). The 375.054-keV energy peak has the highest yield of these energy peaks at 0.0016 percent and was used to determine concentrations. The 129-keV peak has a slightly higher yield but the low-energy gamma ray is significantly attenuated by the steel casing and tool housing and is below the SGLS calibration range (186 to 2615 keV). Concentrations calculated from the 413.71-keV energy line appear to be slightly higher than those calculated from the 375.05-keV energy peak. Interference from the 415.88-keV gamma energy line originating from the decay of ^{241}Am is the probable cause of this discrepancy.

Passive neutron logging was performed in the borehole to detect neutrons that may be generated by interactions of alpha particles with lighter elements such as F, Al, Na, Mg, Si, Cl, and O or from spontaneous fission. Where a transuranic is in the form of a compound with one of these elements, the interaction is most likely because the distance the alpha particle must travel is short. Many transuranic radionuclides decay predominantly by alpha particle emission, and the passive neutron system may be useful to identify the existence of these radionuclides where no gamma emissions are available for detection. No calibration is available for this logging system and the data provided are to be used qualitatively. The passive neutron detector indicates elevated count rates between 46 and 118 ft. The highest count rates (4 to 5 cps) are detected at approximately 48, 110, and 116 ft. At these depths ^{241}Am , ^{239}Pu , and ^{233}Pa are also detected. It is possible these radionuclides and perhaps other isotopes of Pu exist continuously throughout the relatively high neutron count rate interval (46 to 118 ft) even where no isotope was identified at levels above the respective MDLs.

No man-made radionuclides were detected below 120 ft. A detection of probable ^{137}Cs at 151 ft is likely the result of a statistical fluctuation and is not considered a valid detection. Because no man-made radionuclides were observed below 120 ft, the passive neutron logging was discontinued below 197 ft (log run 14).

The ^{40}K and ^{232}Th logs showed an increase in concentrations at approximately 46 ft, perhaps suggesting a lithology change. Apparent ^{232}Th concentrations are elevated by approximately 0.4 pCi/g in the interval between 109 and 117 ft, and this increase corresponds with fine-grained sediment of the Cold Creek Interval formerly known as the Early Palouse Soil. The relatively low ^{40}K and ^{232}Th values in the interval between 116 and 120 ft, as well as the relatively high ^{238}U values, are characteristic of the carbonate paleosols of the Cold Creek Interval. Enhanced radon was observed in this borehole during log runs 2 and 3 (April 27, 2004) from approximately 44 to 58 ft and 91 to 117 ft. Log data acquired on other dates did not exhibit enhanced radon. The enhanced ^{40}K , ^{238}U , and ^{232}Th concentrations at approximately 125 ft reflect the bentonite seal placed in the annulus between the 13- and 12-in. casings.

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data for the natural and man-made radionuclides. The passive neutron data are less repeatable but show enhanced count rates at similar depth locations.

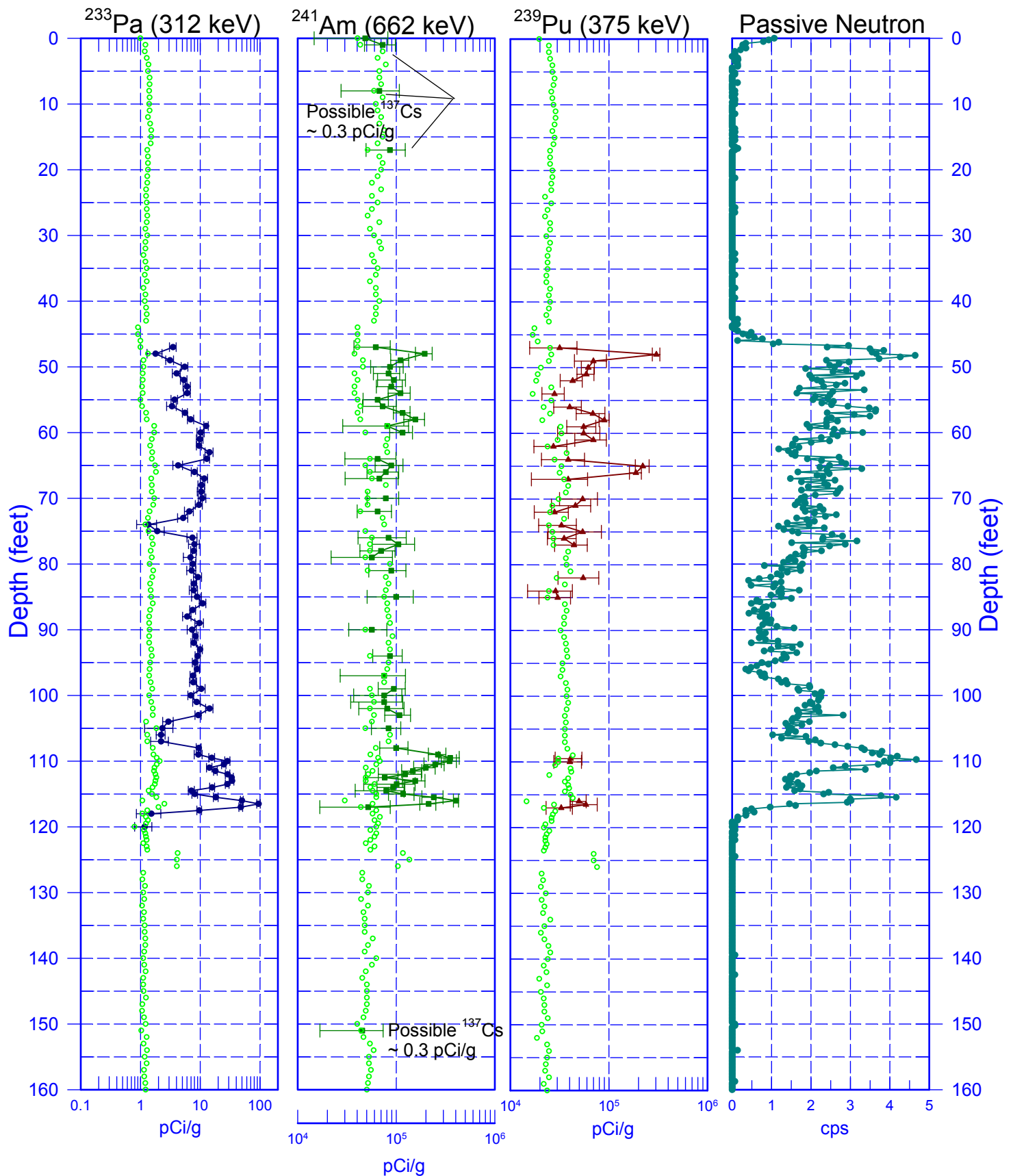
¹ GWL – groundwater level

² TOC – top of casing

³ N/A – not applicable

299-W15-46 (C3426)

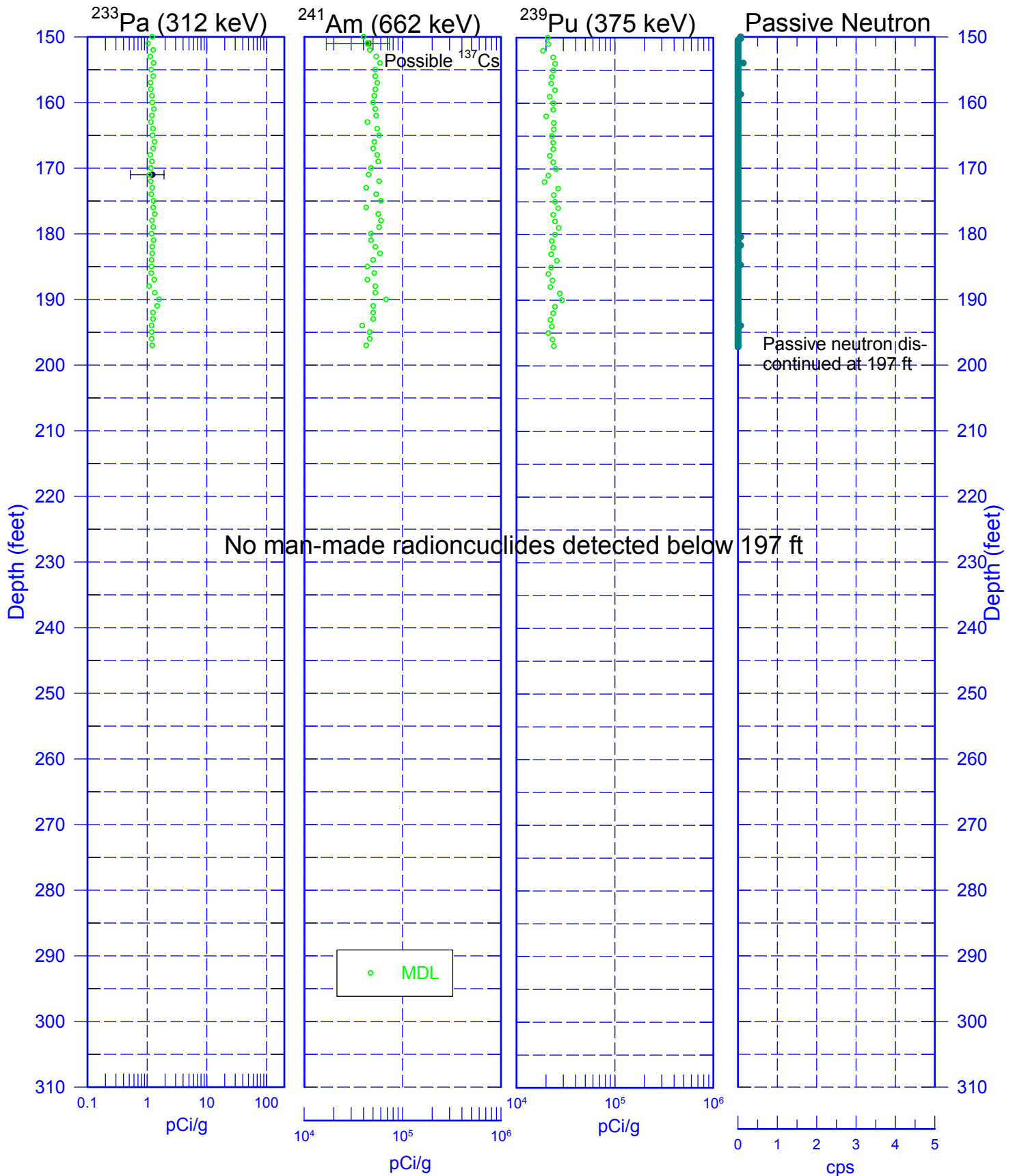
Man-Made Radionuclides



Last Log Date - 01/27/05

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Man-Made Radionuclides

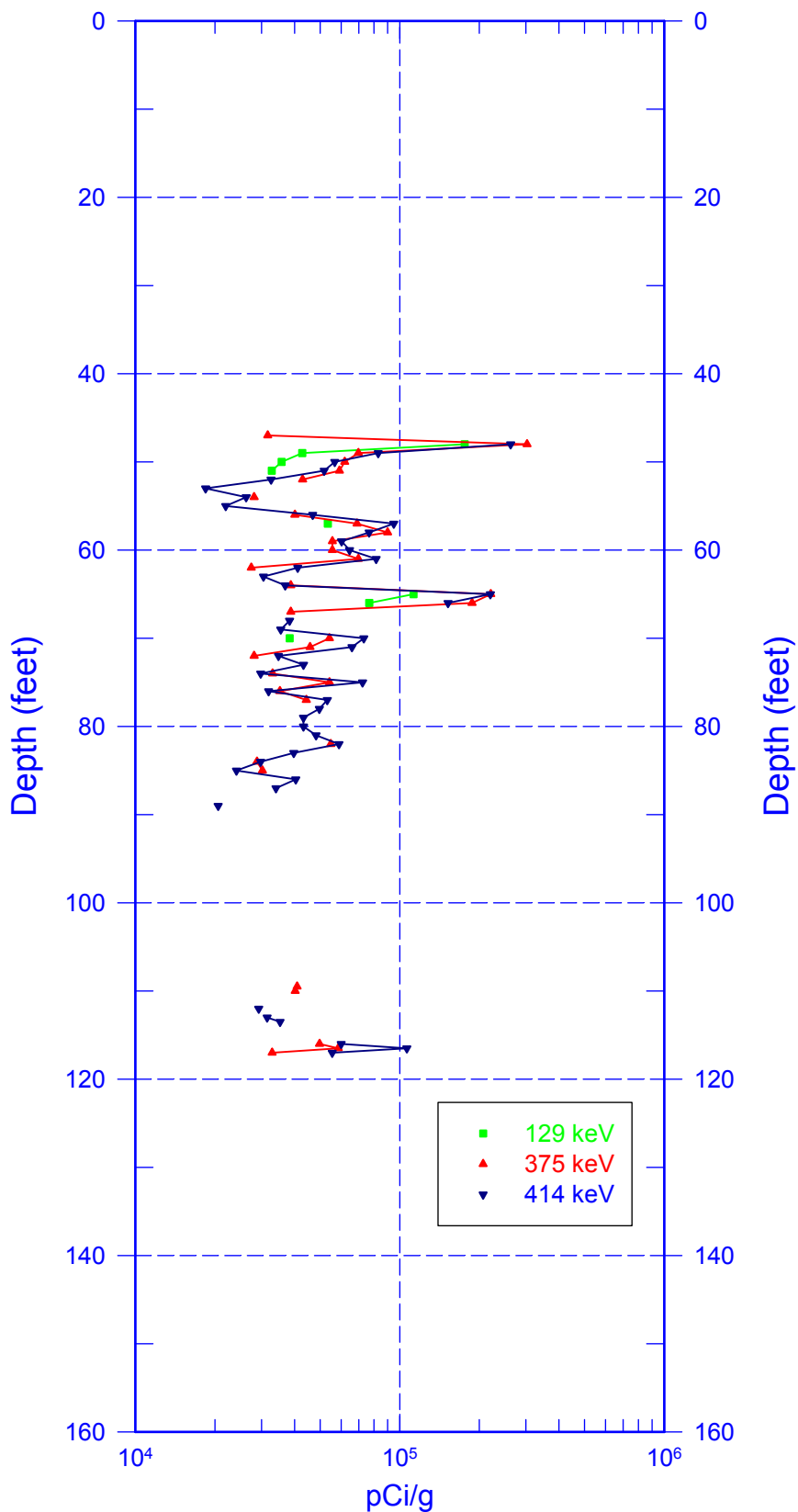


Zero Reference = Ground Surface

Last Log Date - 01/27/05

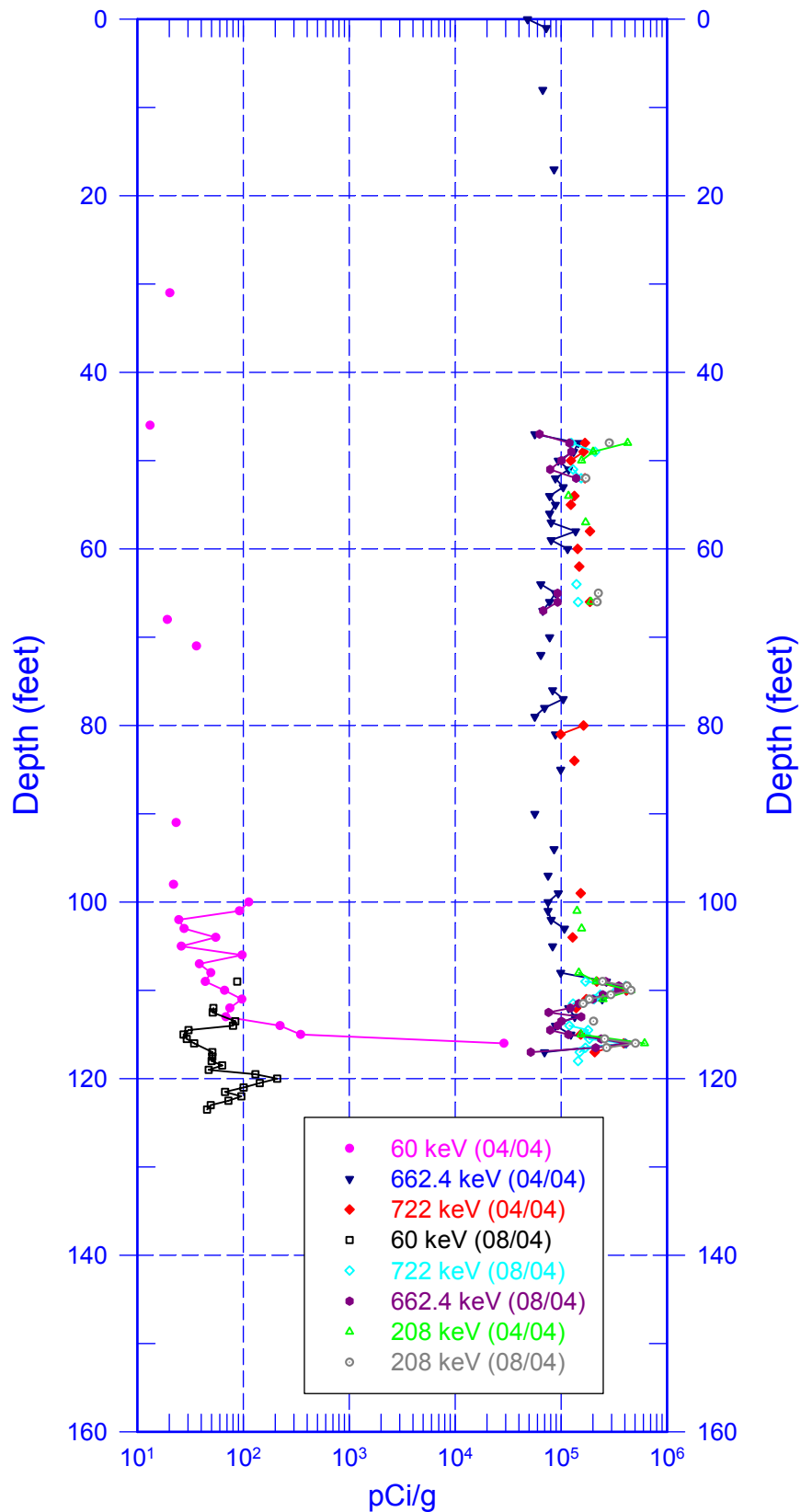
299-W15-46 (C3426)

Pu-239 Energy Peak Comparison



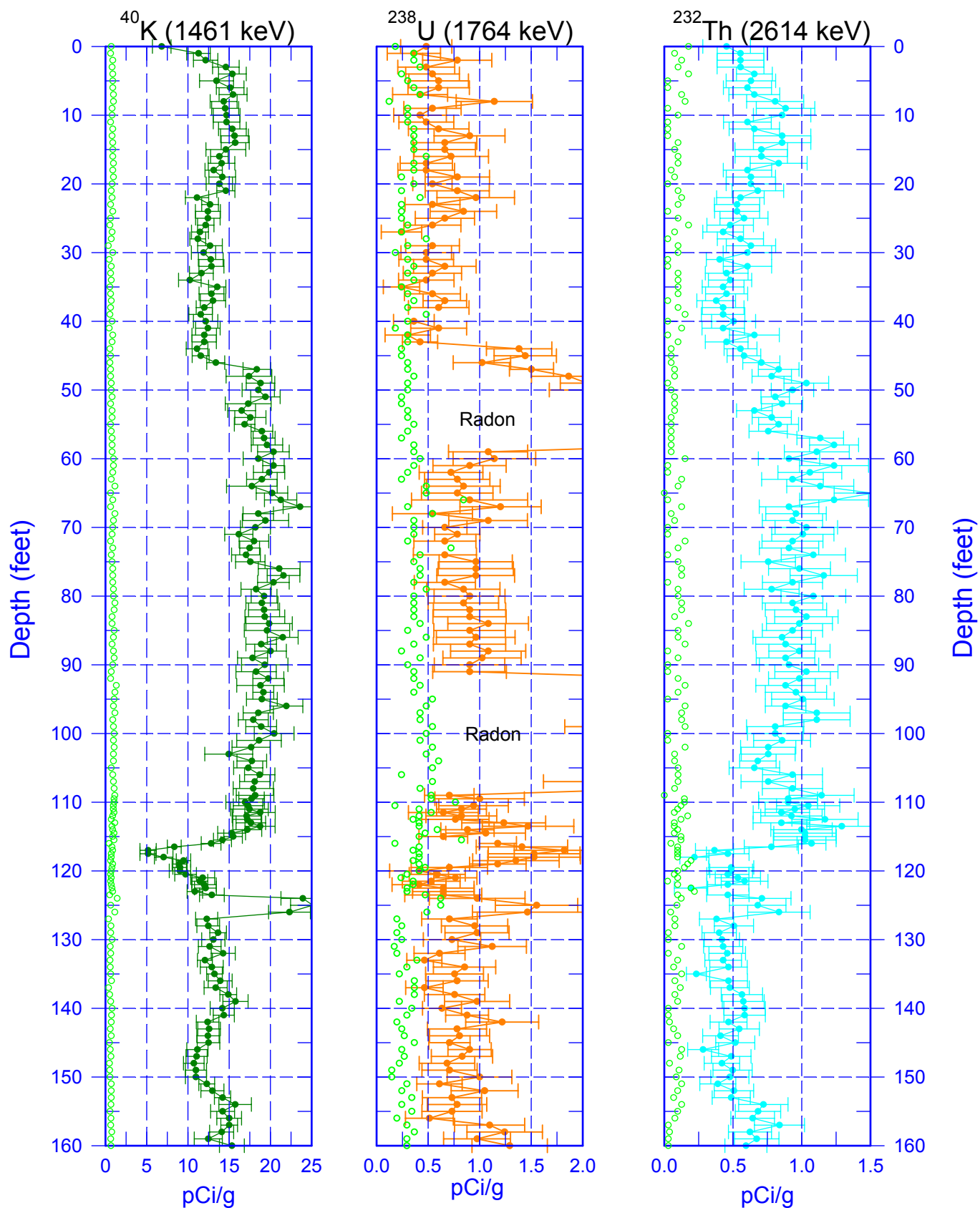
299-W15-46 (C3426)

Am-241 Energy Peak Comparison



299-W15-46 (C3426)

Natural Gamma Logs



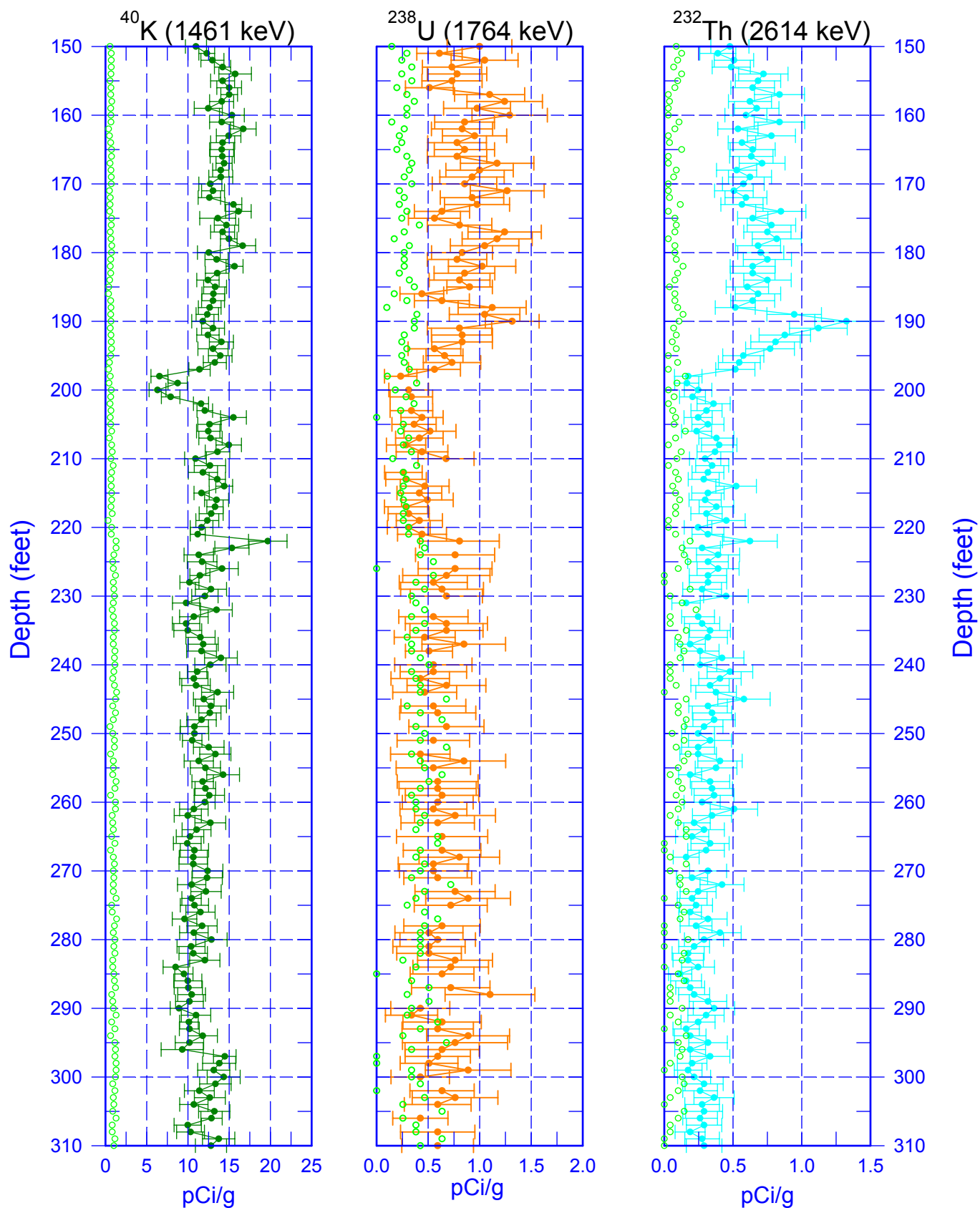
Zero Reference = Ground Surface

Depth scale: 1" = 20 ft

Last Log Date - 01/27/05

299-W15-46 (C3426)

Natural Gamma Logs



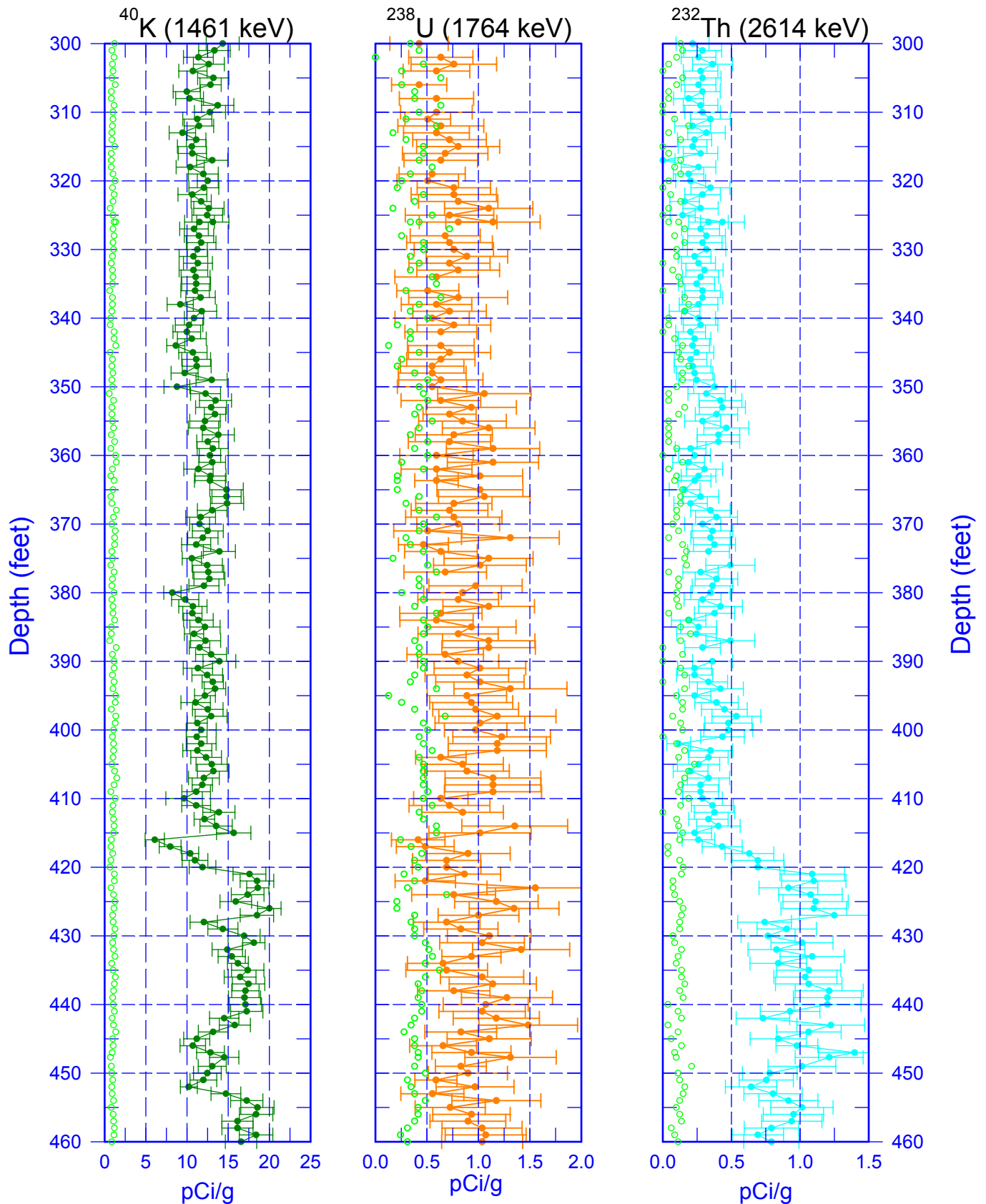
Zero Reference = Ground Surface

Depth scale: 1" = 20 ft

Last Log Date - 01/27/05

299-W15-46 (C3426)

Natural Gamma Logs



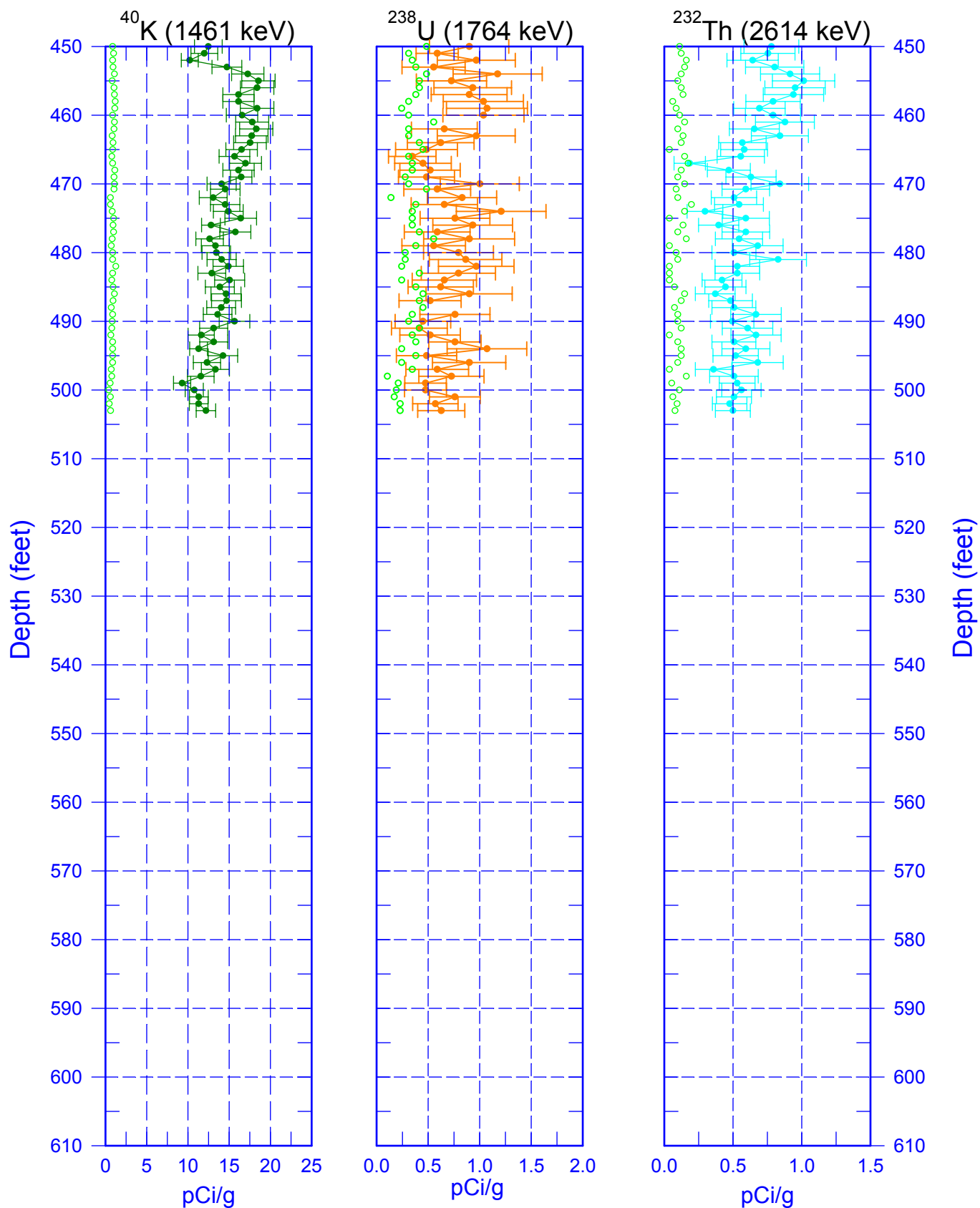
Zero Reference = Ground Surface

Depth scale: 1" = 20 ft

Last Log Date - 01/27/05

299-W15-46 (C3426)

Natural Gamma Logs

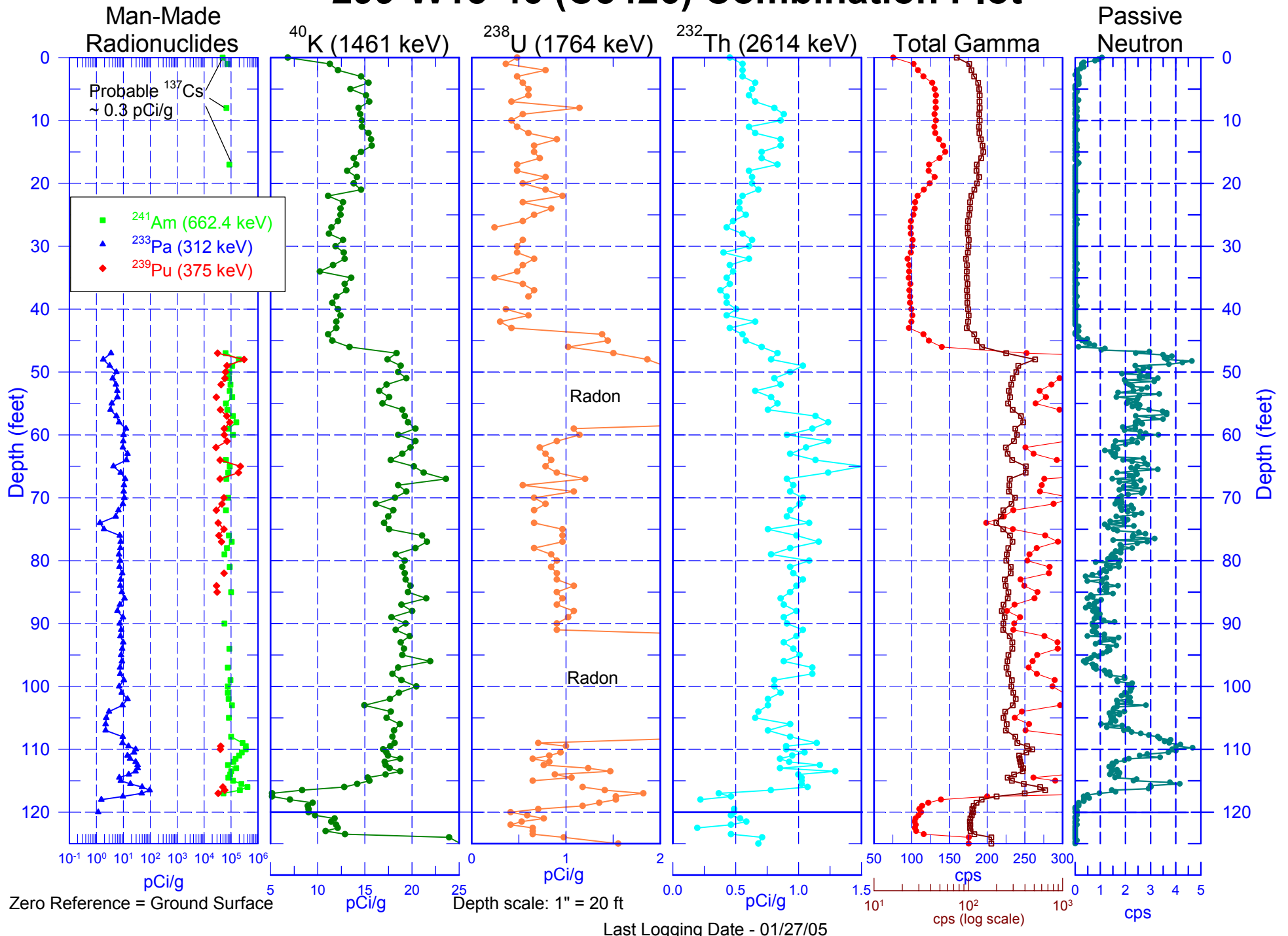


Zero Reference = Ground Surface

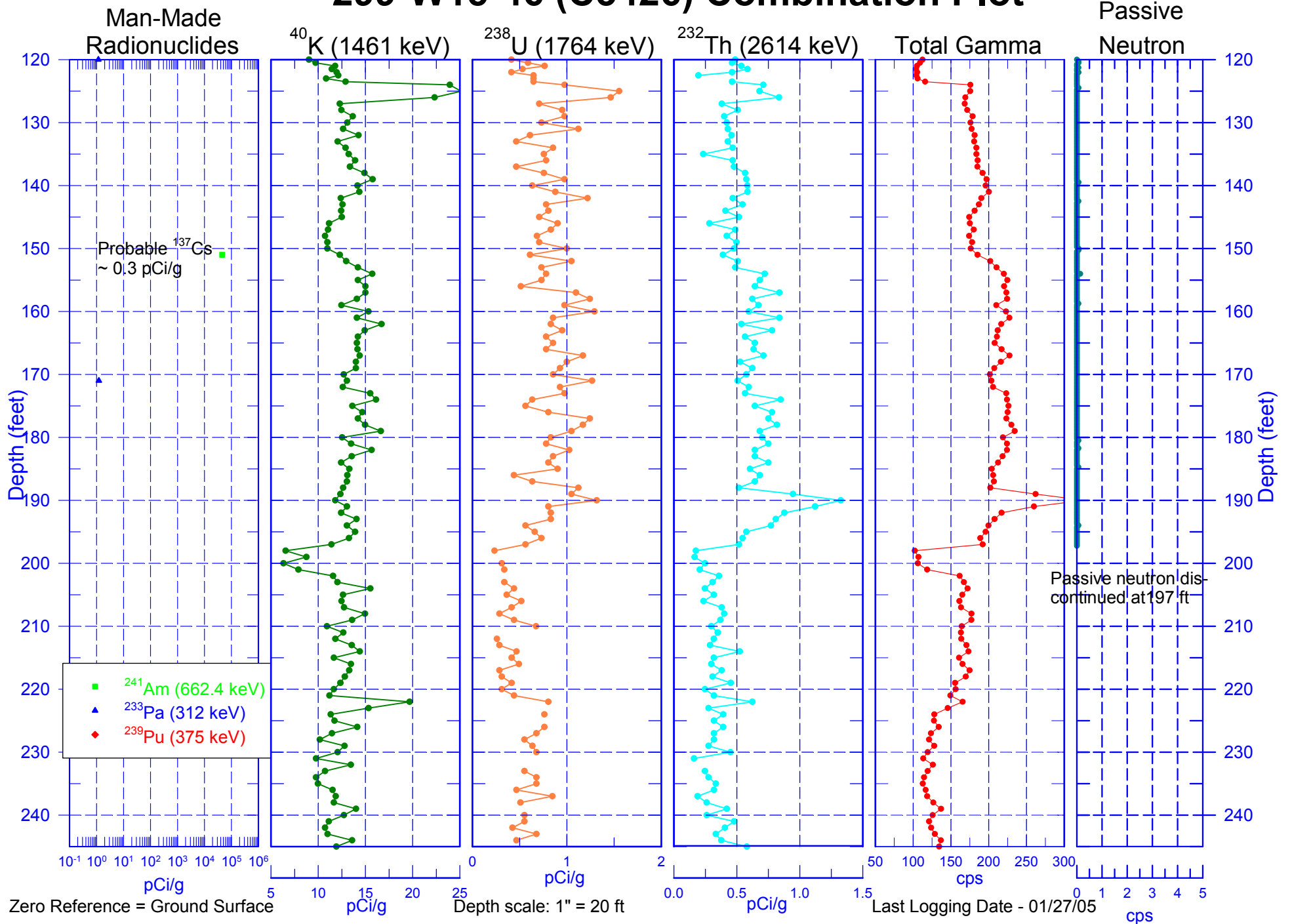
Depth scale: 1" = 20 ft

Last Log Date - 01/27/05

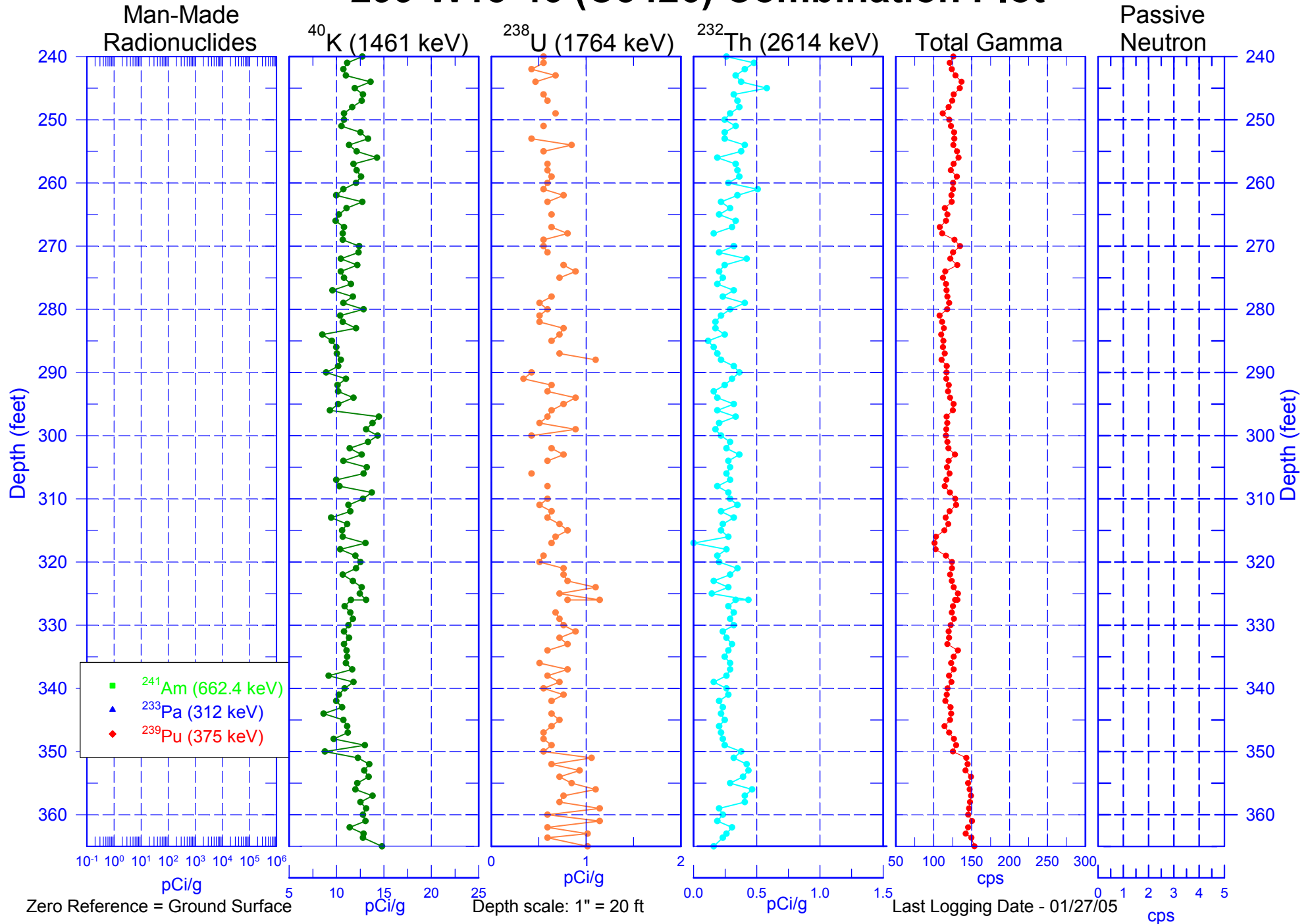
299-W15-46 (C3426) Combination Plot



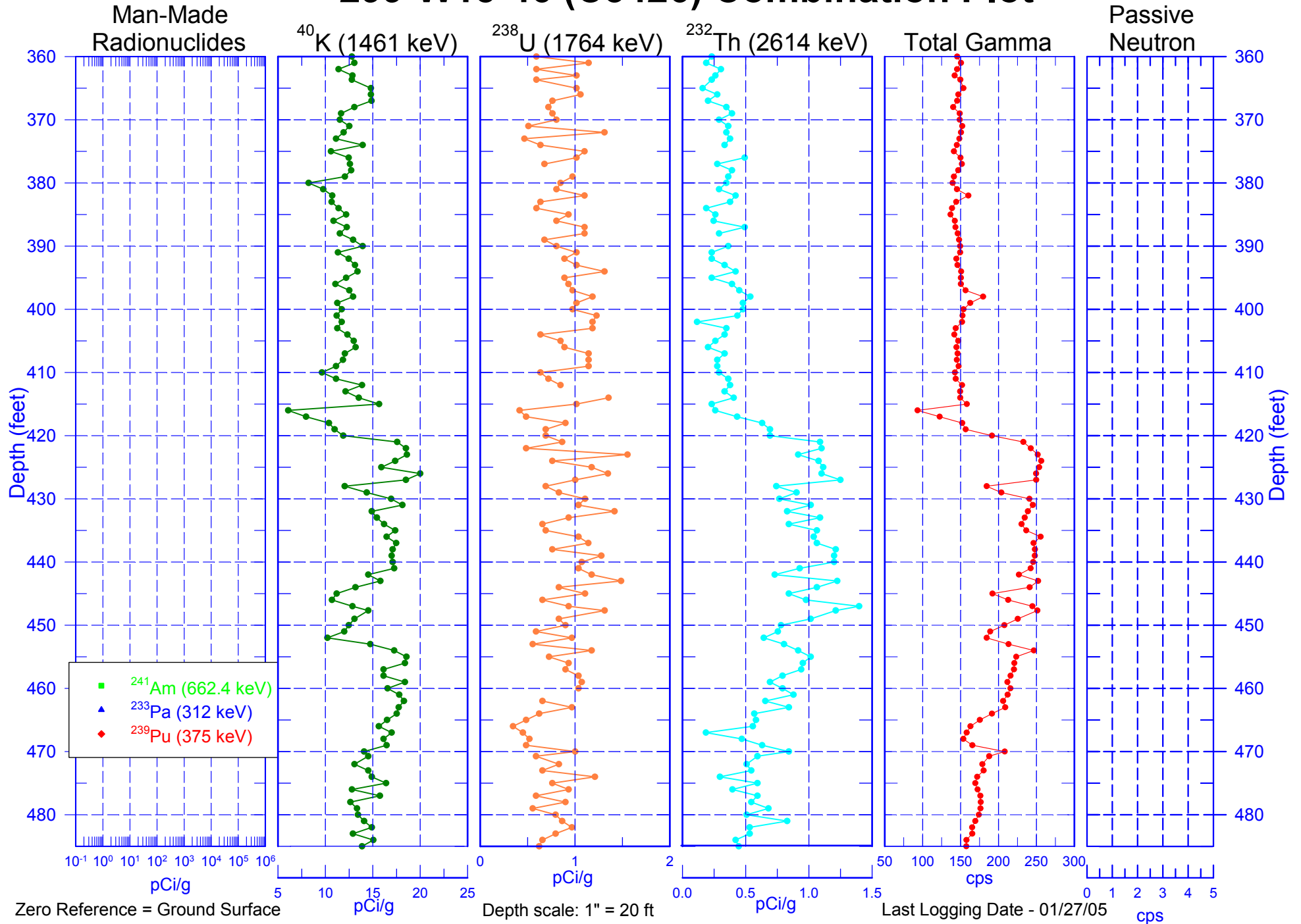
299-W15-46 (C3426) Combination Plot



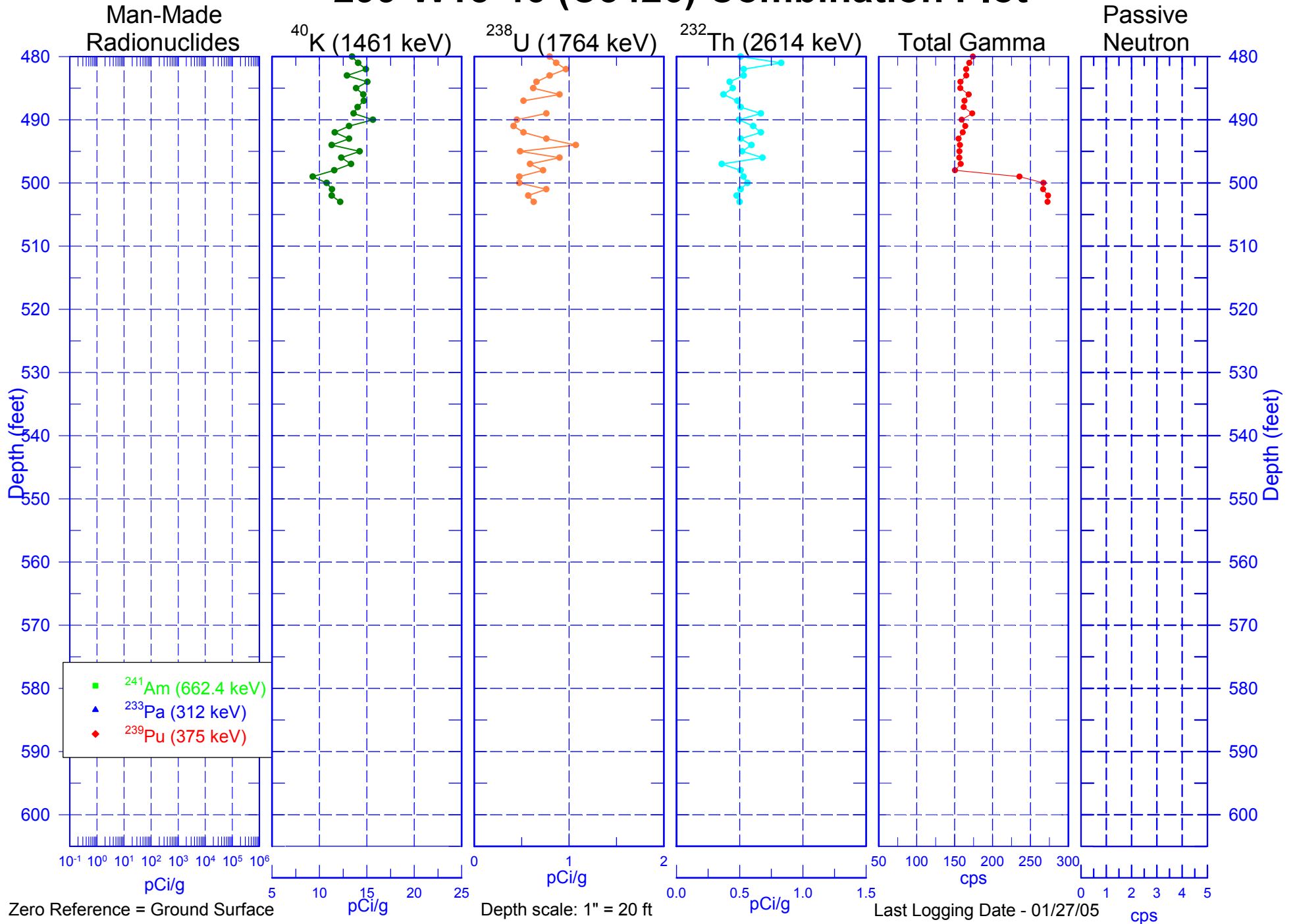
299-W15-46 (C3426) Combination Plot



299-W15-46 (C3426) Combination Plot

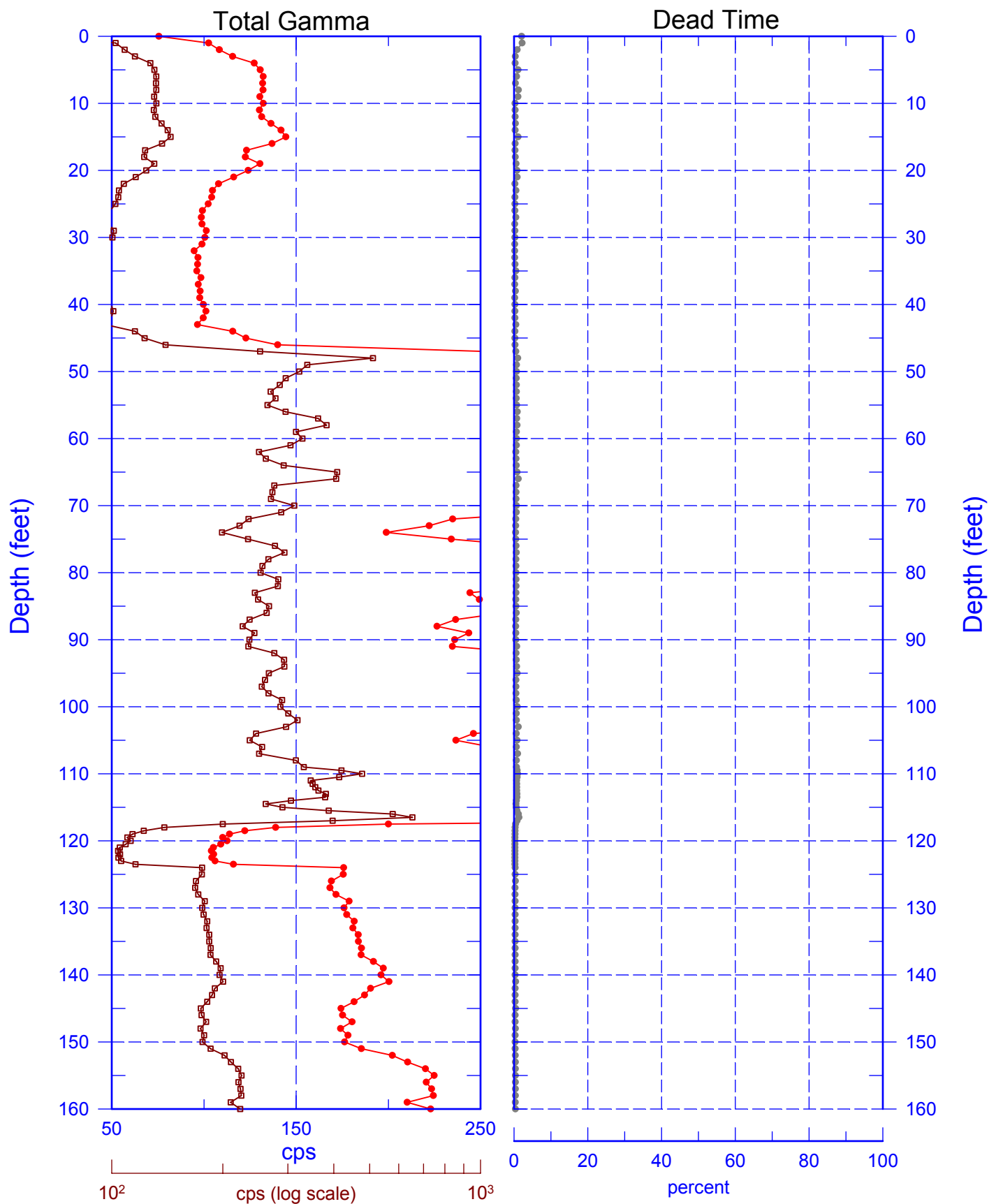


299-W15-46 (C3426) Combination Plot



299-W15-46 (C3426)

Total Gamma & Dead Time

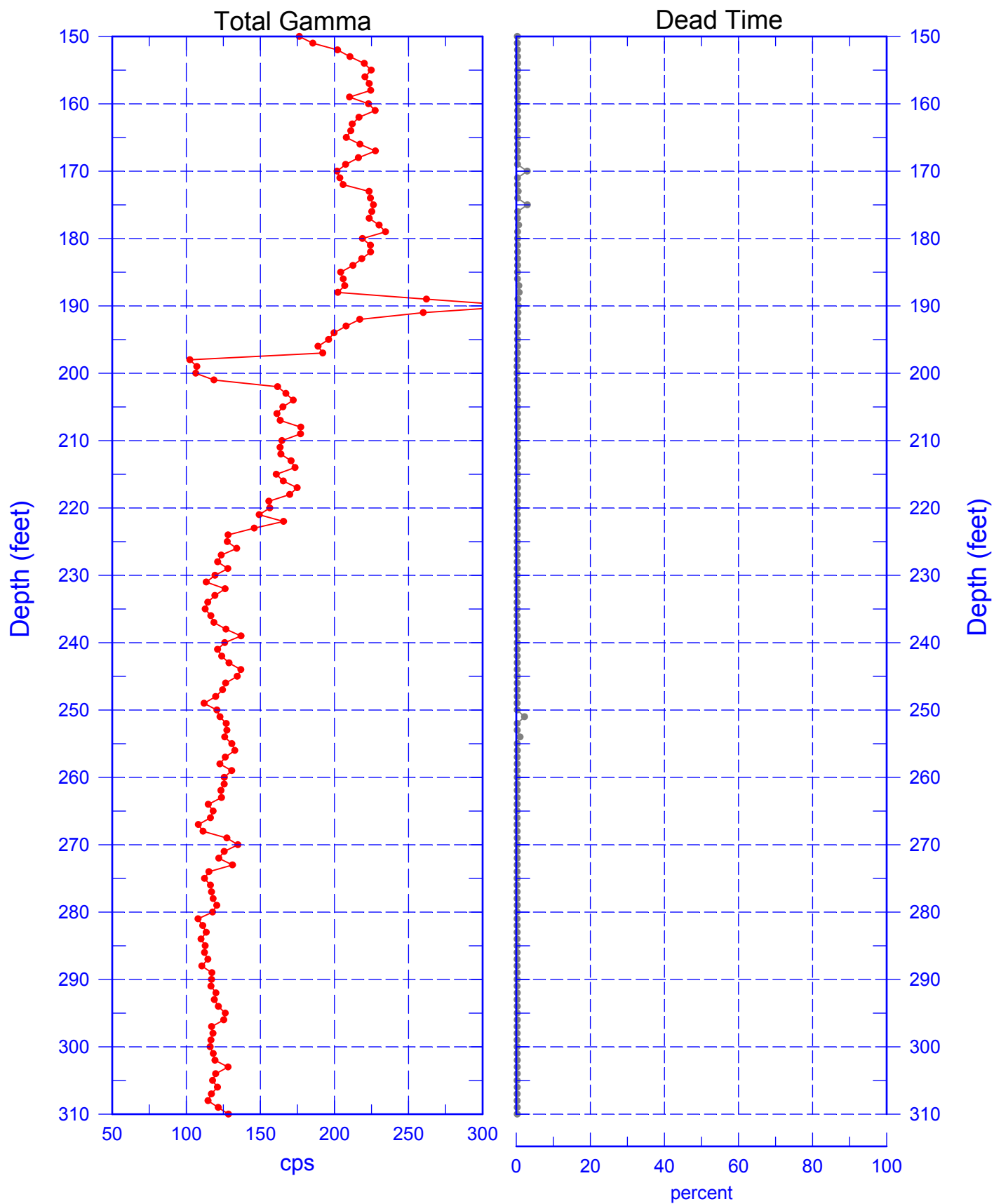


Zero reference = Ground Surface

Last Log Date - 01/27/05

299-W15-46 (C3426)

Total Gamma & Dead Time

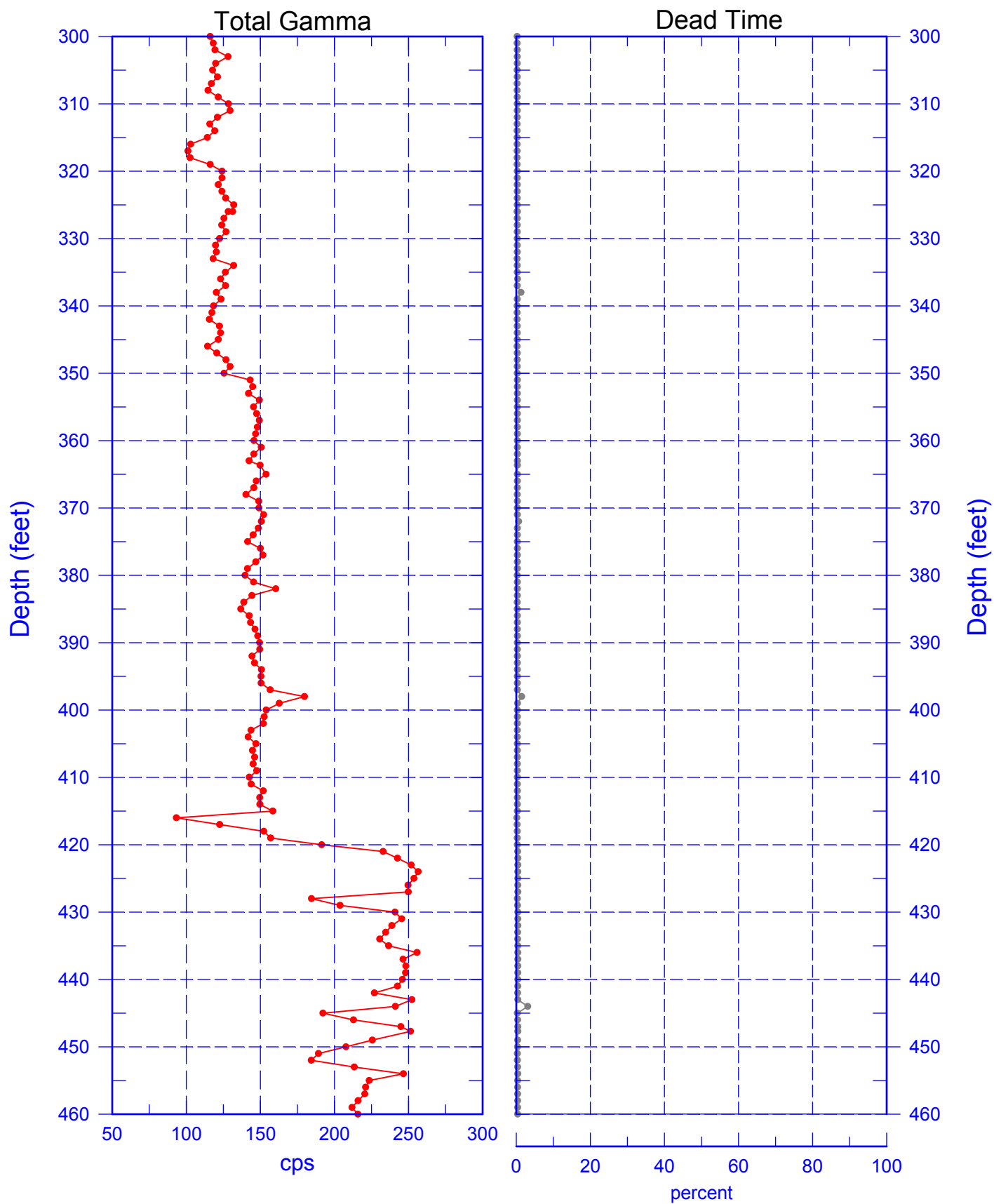


Zero reference = Ground Surface

Last Log Date - 01/27/05

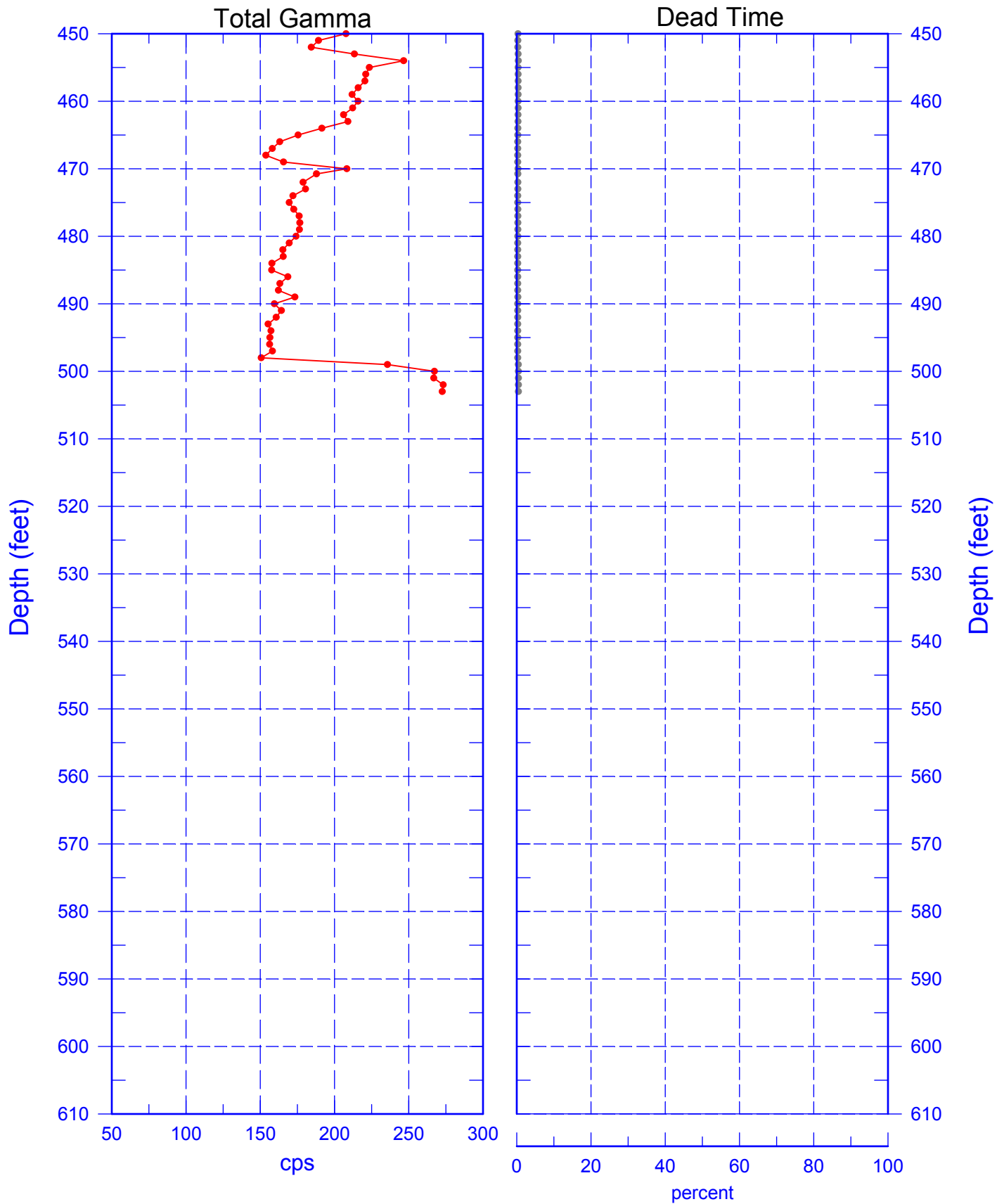
299-W15-46 (C3426)

Total Gamma & Dead Time



299-W15-46 (C3426)

Total Gamma & Dead Time

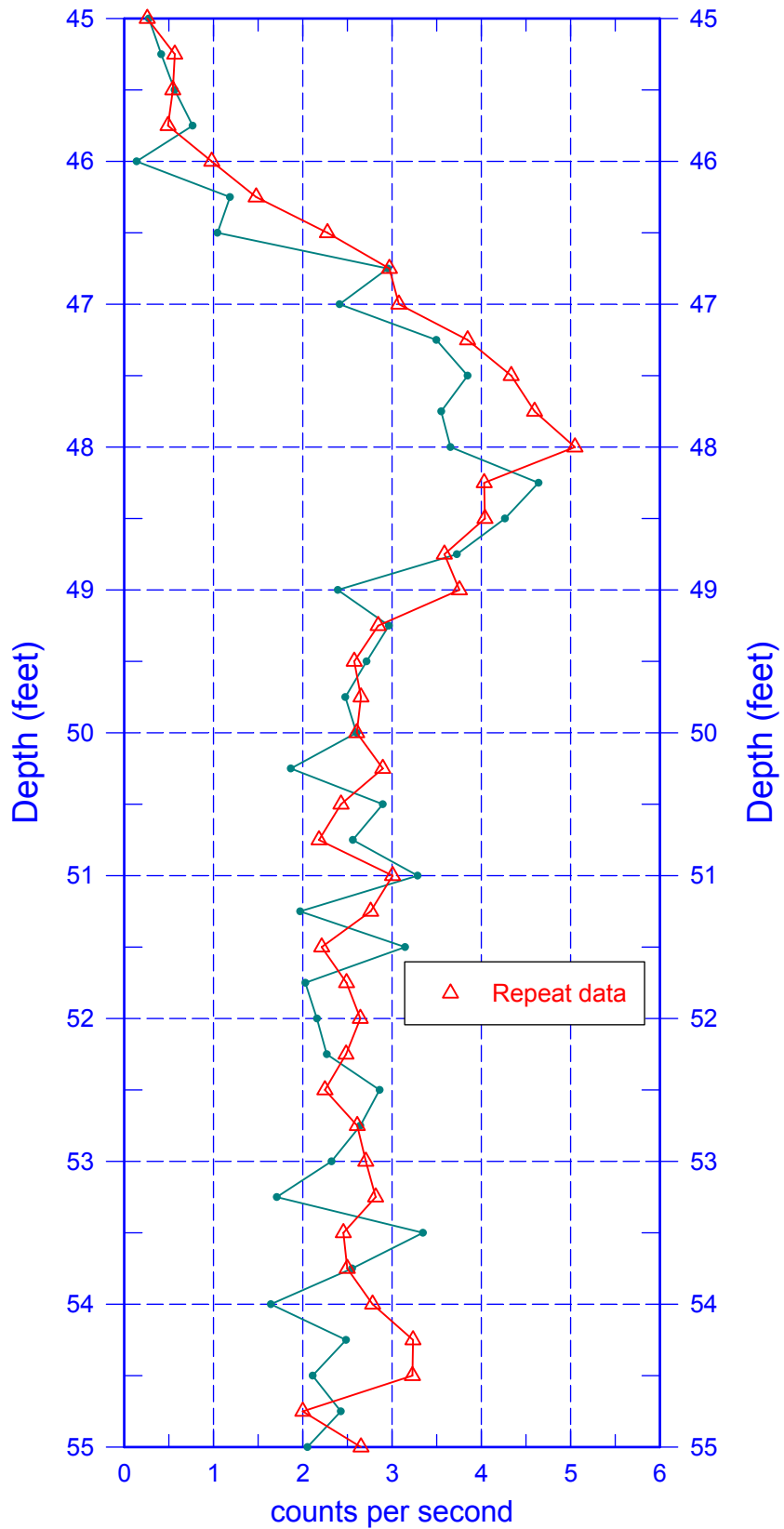


Zero reference = Ground Surface

Last Log Date - 01/27/05

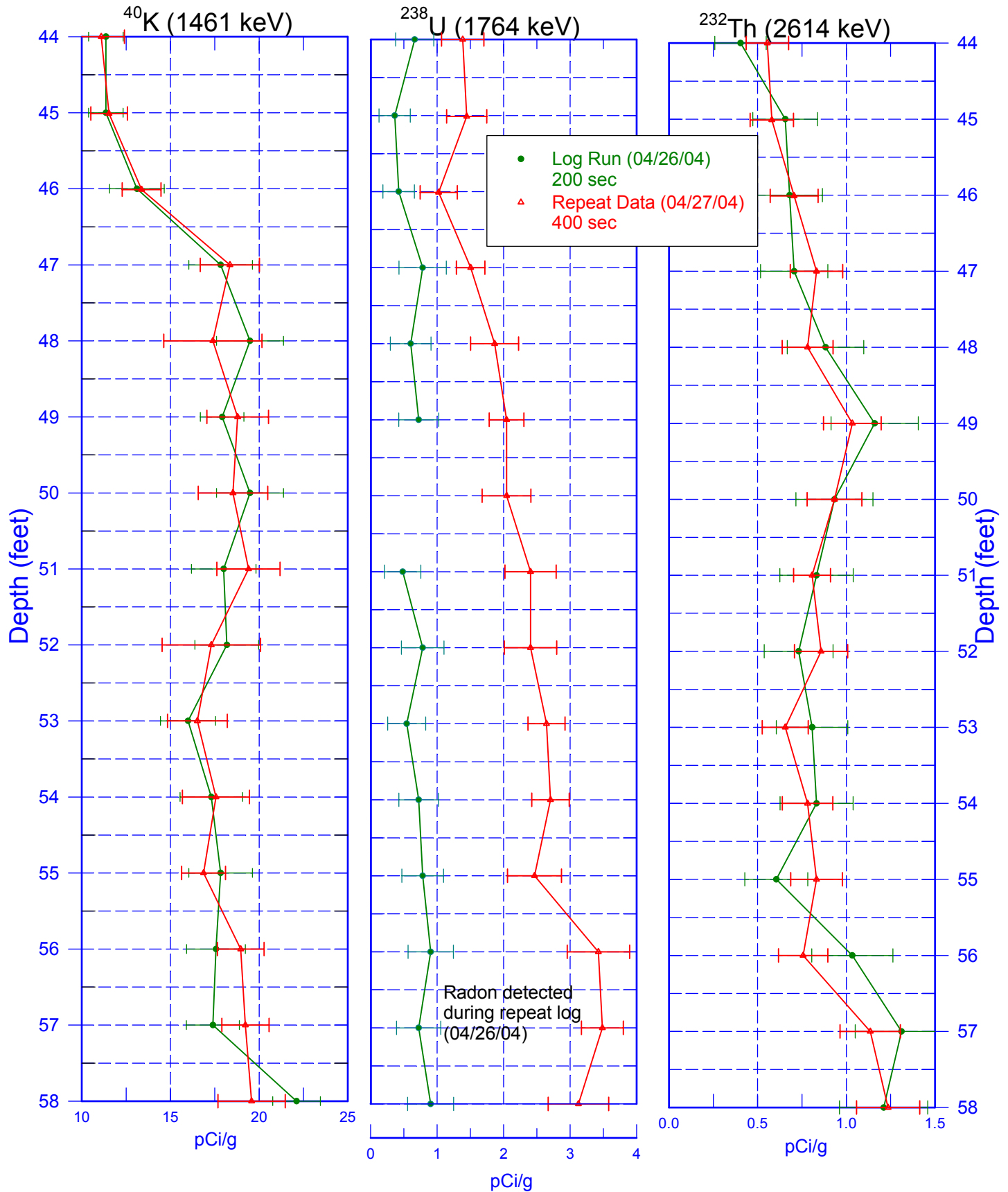
299-W15-46 (C3426)

Passive Neutron Repeat



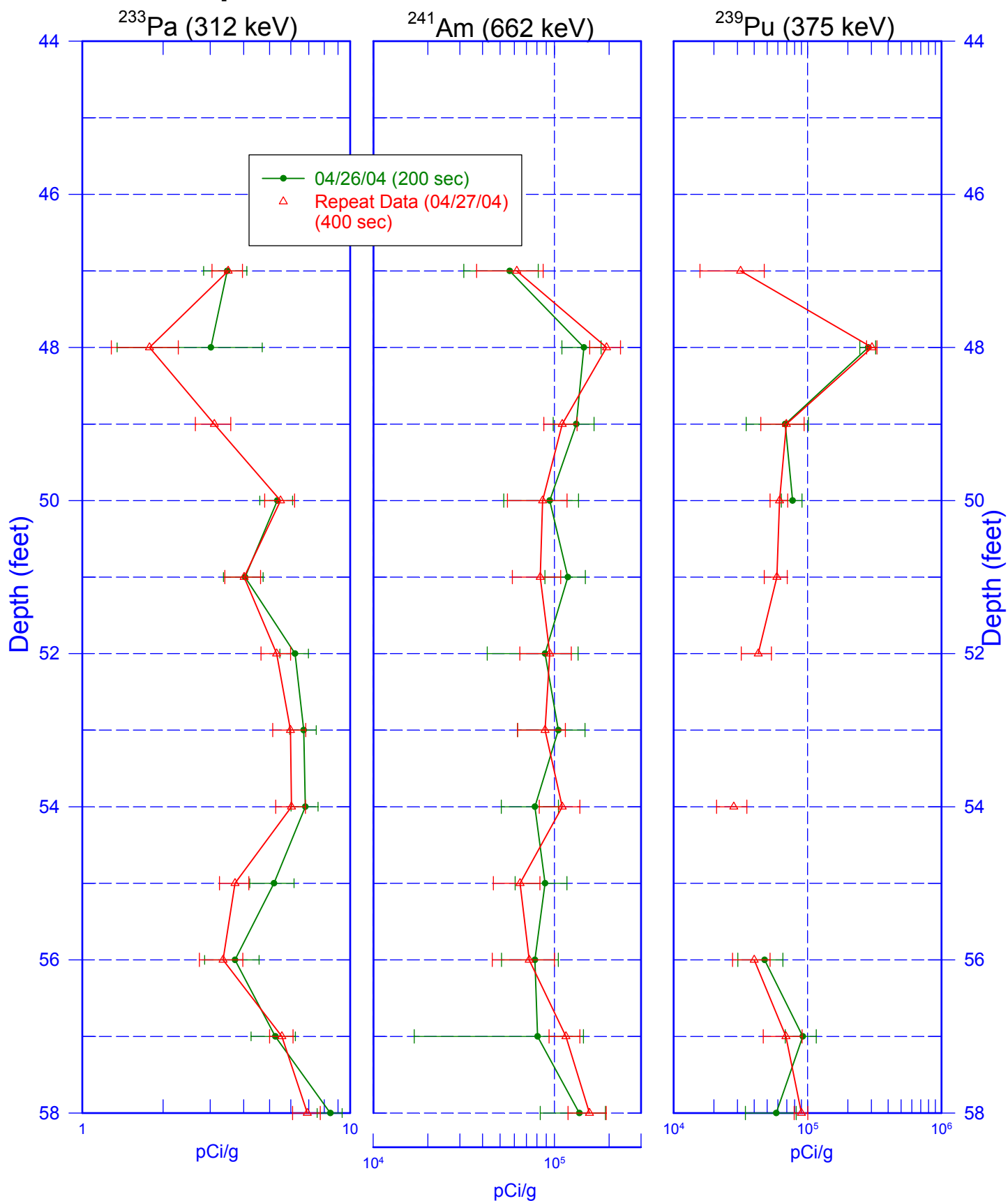
299-W15-46 (C3426)

Repeat Section of Natural Gamma Logs



299-W15-46 (C3426)

Repeat Section of Man-Made Radionuclides

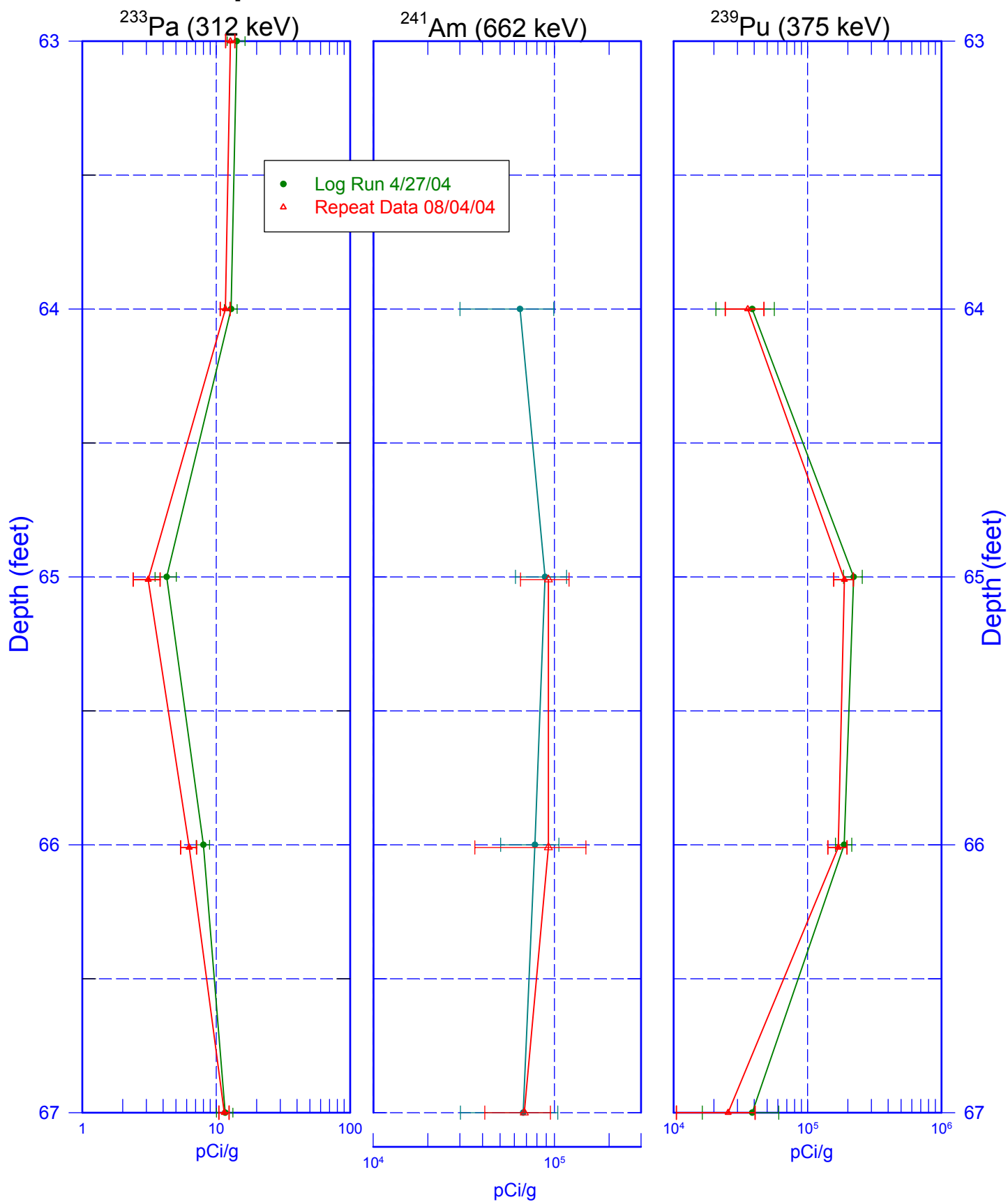


Zero Reference = Ground Surface

Last Log Date - 01/27/05

299-W15-46 (C3426)

Repeat Section of Man-Made Radionuclides

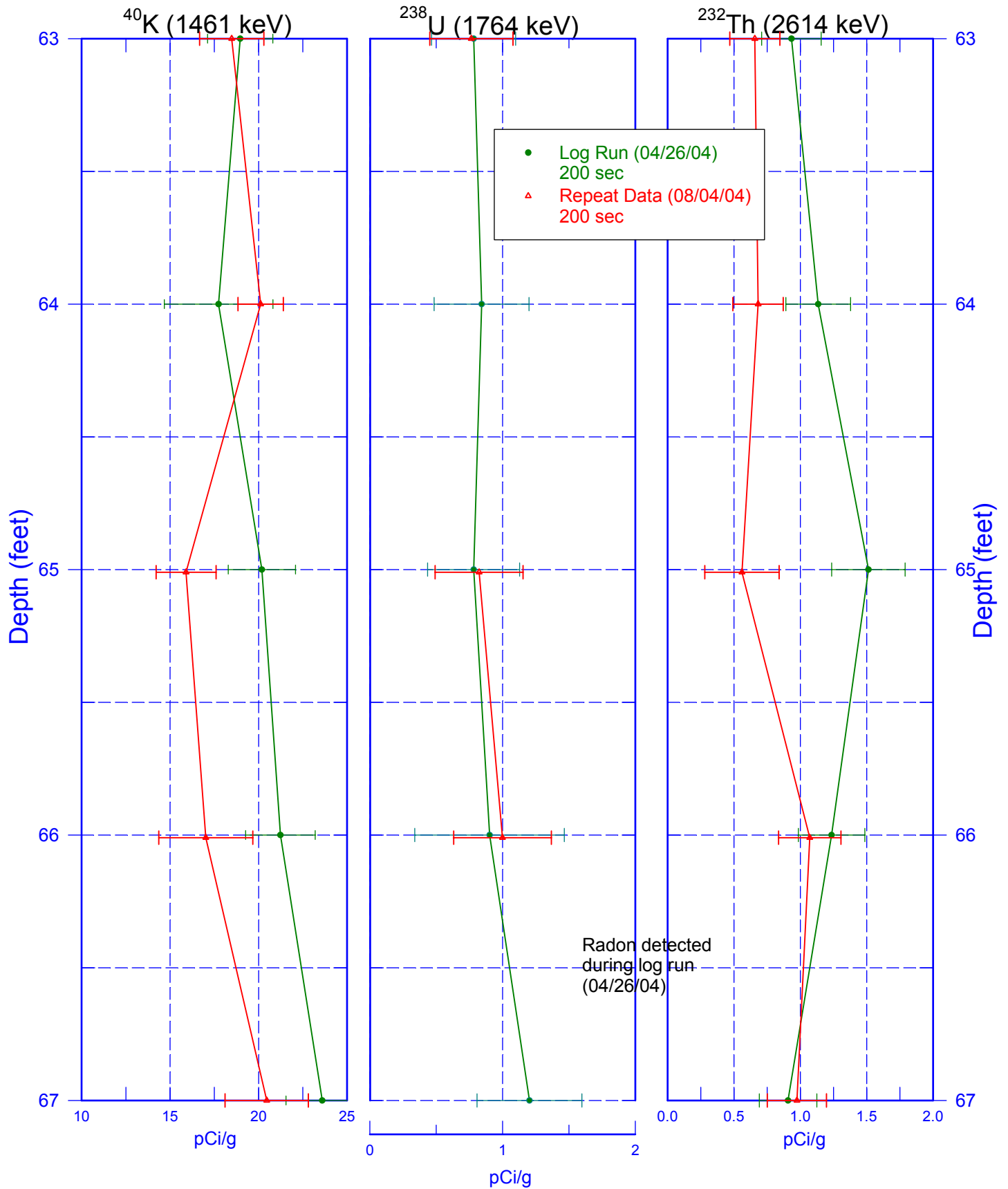


Zero Reference = Ground Surface

Last Log Date - 01/27/05

299-W15-46 (C3426)

Repeat Section of Natural Gamma Logs

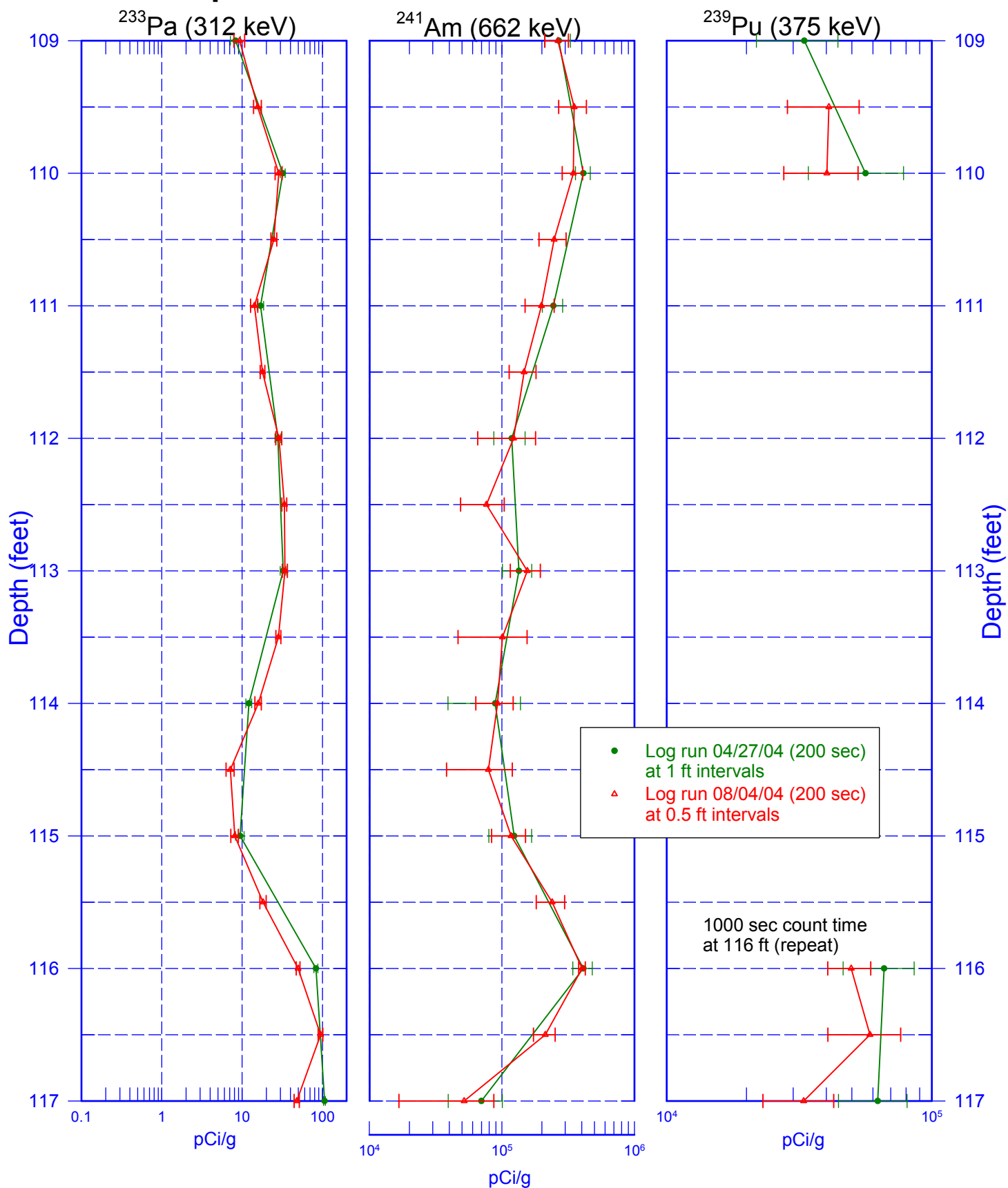


Zero Reference = Ground Surface

Last Log Date - 01/27/05

299-W15-46 (C3426)

Repeat Section of Man-Made Radionuclides

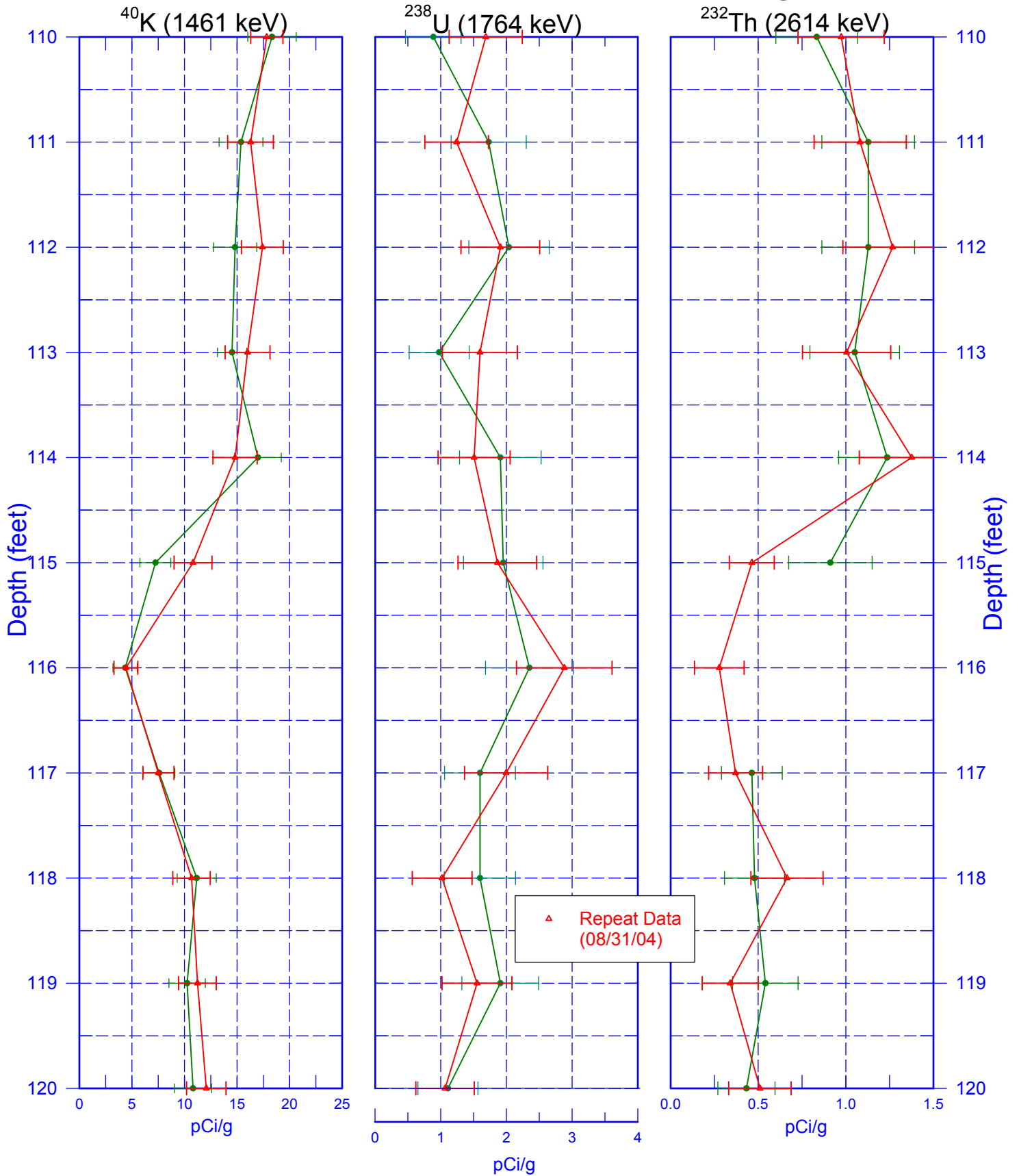


Zero Reference = Ground Surface

Last Log Date - 01/27/05

299-W15-46 (C3426)

Repeat Section of Natural Gamma Logs

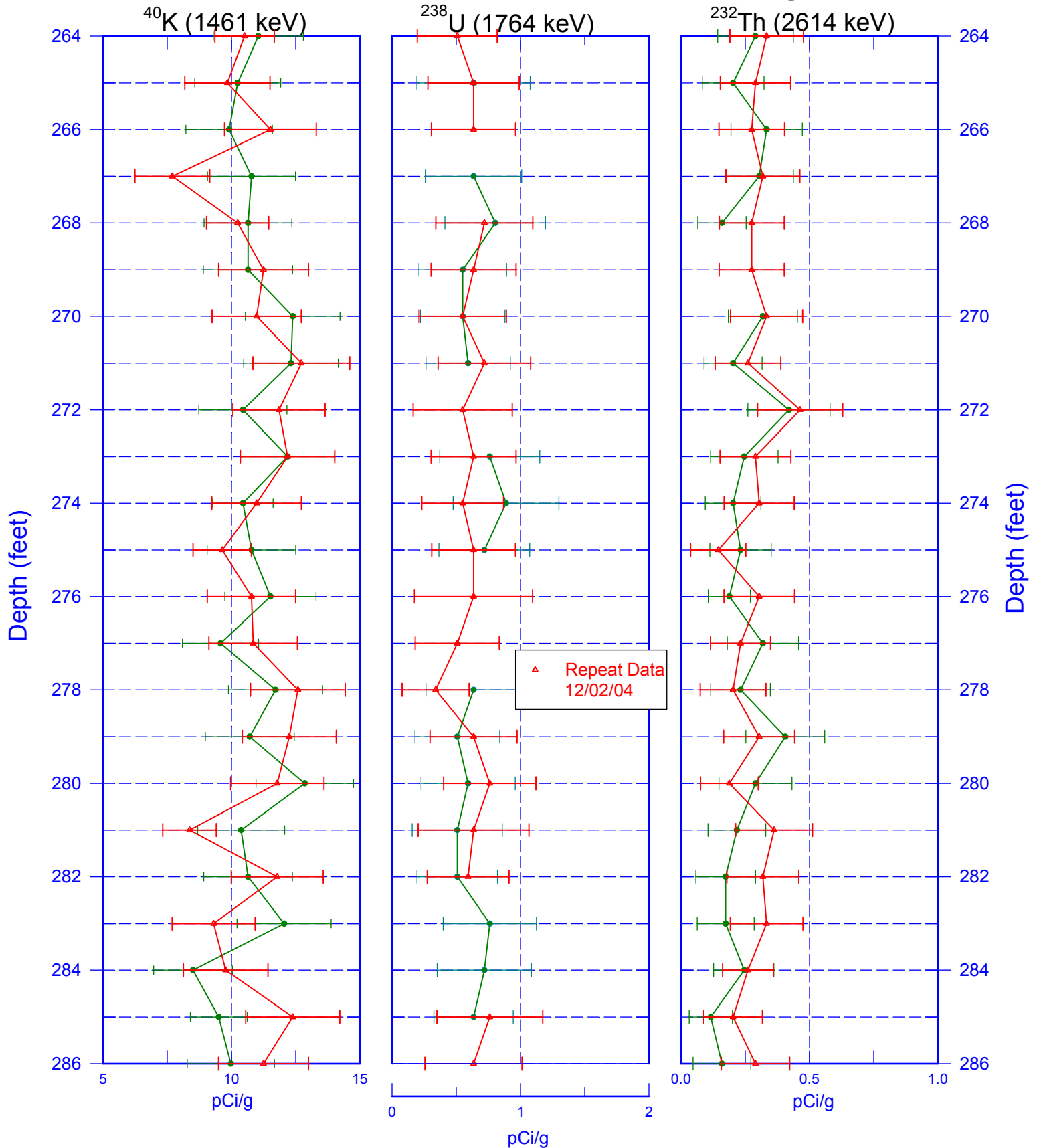


Zero Reference = Ground Surface

Last Log Date - 01/27/05

299-W15-46 (C3426)

Repeat Section of Natural Gamma Logs

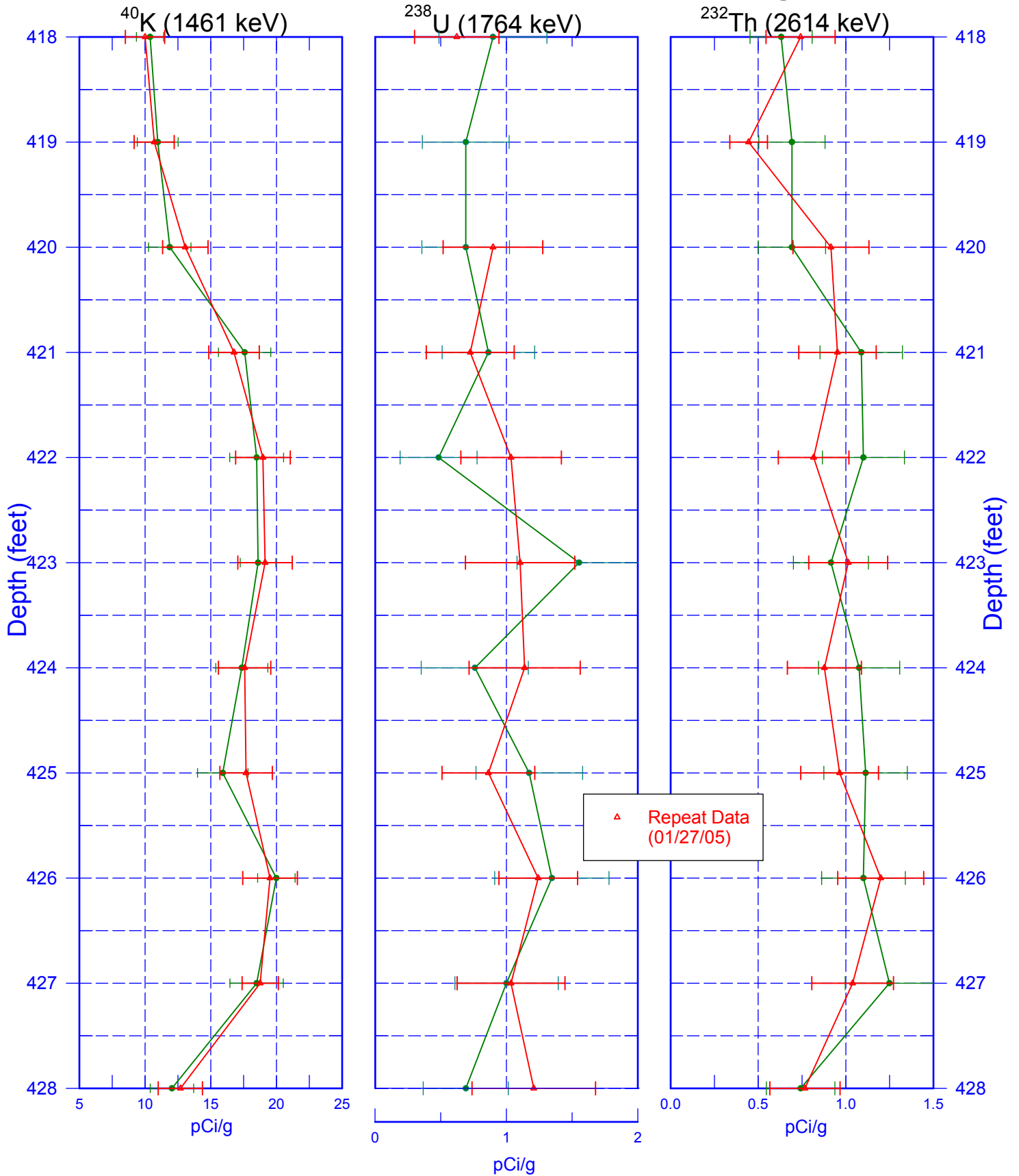


Zero Reference = Ground Surface

Last Log Date - 01/27/05

299-W15-46 (C3426)

Repeat Section of Natural Gamma Logs

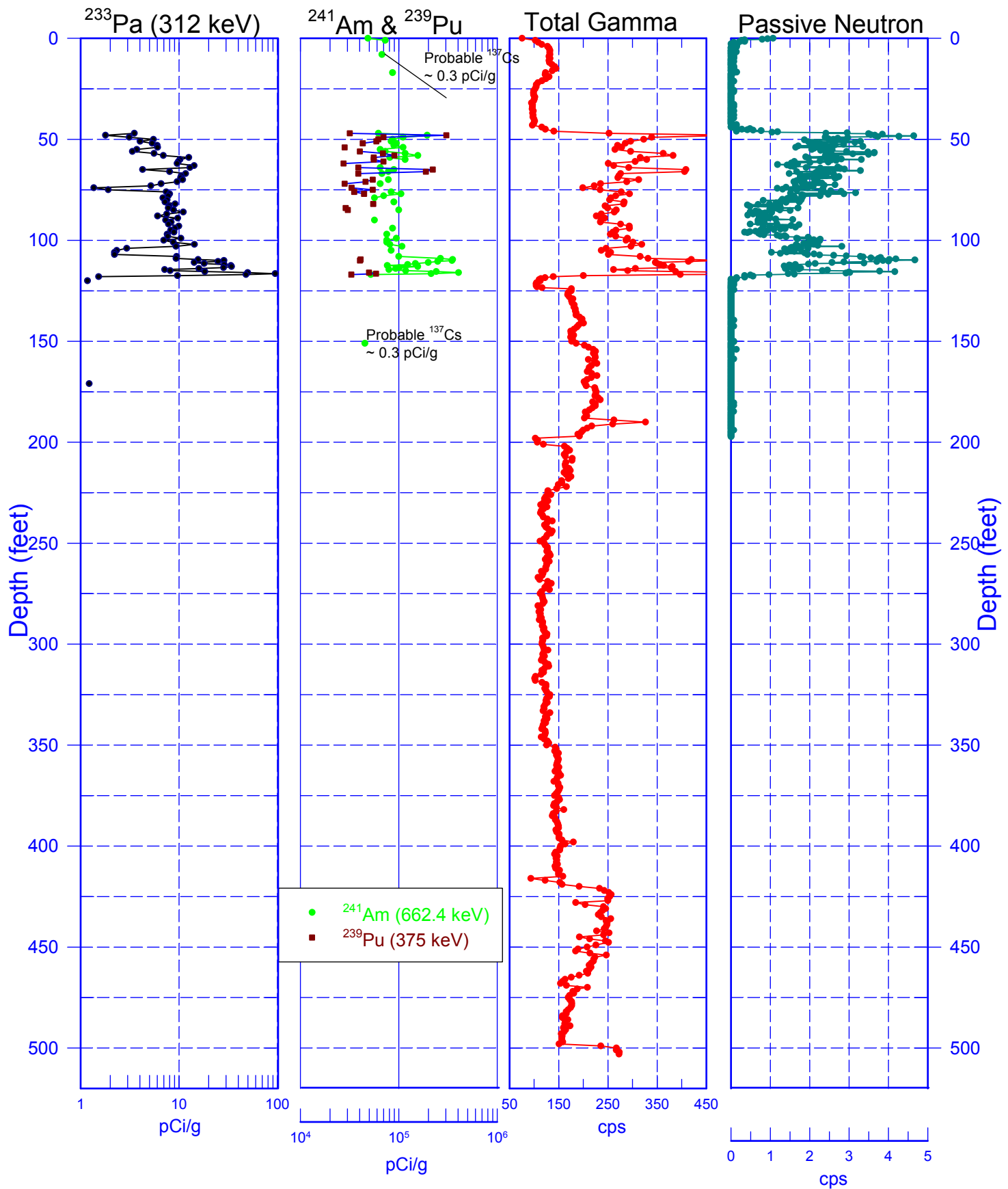


Zero Reference = Ground Surface

Last Log Date - 01/27/05

299-W15-46 (C3426)

Man-Made Radionuclides



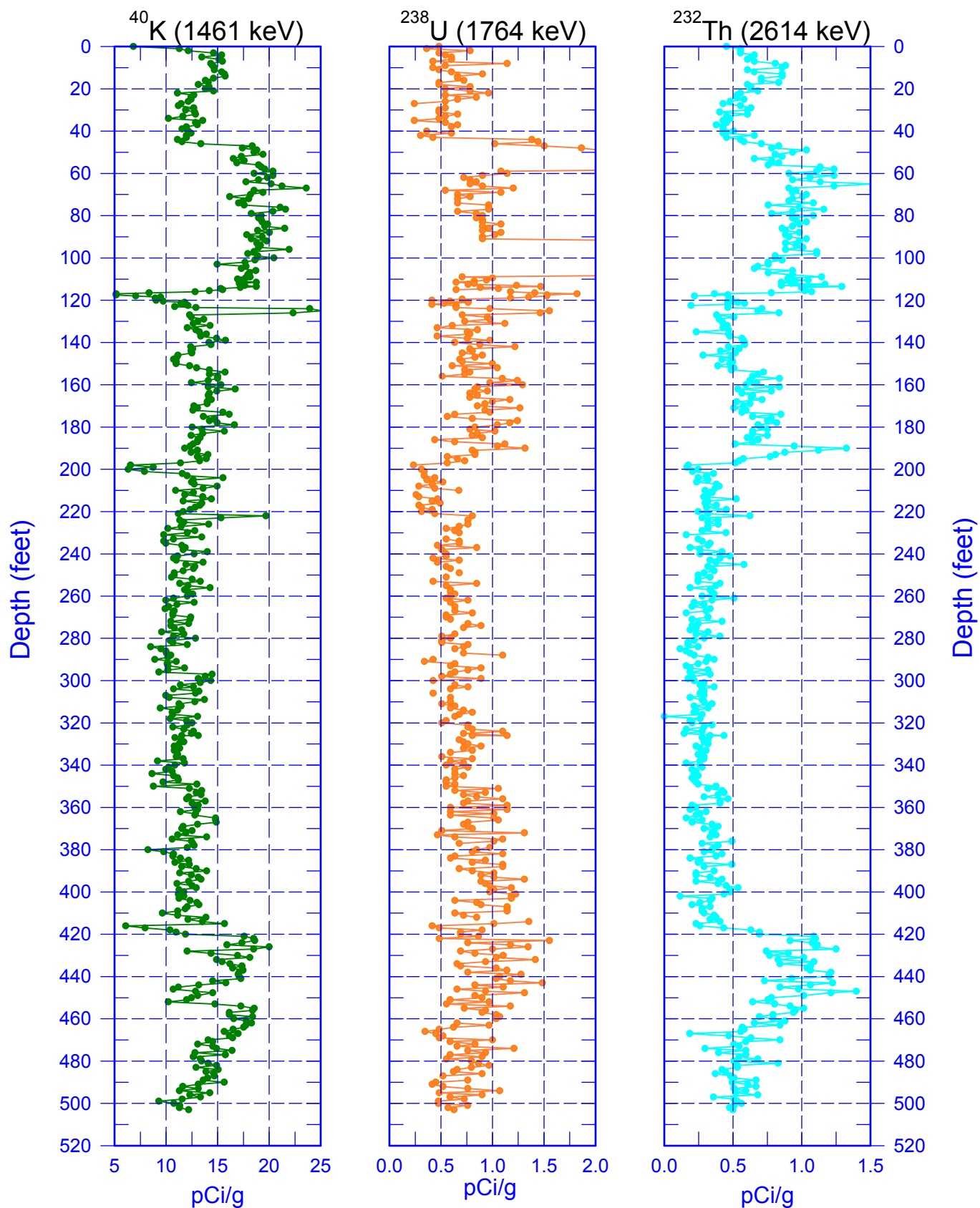
Zero Reference = Ground Surface

Depth Scale: 1" = 65 ft

Last Log Date - 01/27/05

299-W15-46 (C3426)

Natural Gamma Logs



Zero Reference = Ground Surface

Depth scale: 1" = 65 ft

Last Log Date - 01/27/05